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1984 DIRECT STRIKE LIGHTNING DATA

Mitchel E. Thomas

and

Harold K. Carney

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

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Mitchel E. Thomas and Harold K. Carney
Langley Research Center
Hampton, Virginia 23665

SUMMARY

This report presents the wideband waveforms recorded during the 1984 Direct-Strike Lightning Tests of the NASA Langley Research Center lightning-instrumented F-106B aircraft. The tests were conducted within about 150 nautical miles of the NASA Langley Research Center, Hampton, Virginia, where the aircraft was based. The entire transient recorder data obtained for 247 strikes and 11 nearby flashes in the 1984 campaign are presented in this report.

SYMBOLS

B	magnetic flux density, tesla
D	electric flux density, coulomb per square meter
I	current, ampere
A/m^2	ampere per square meter
m	meter
MHz	megahertz
T/s	tesla per second
A	ampere
A/s	ampere per second
V	volt

SUBSCRIPTS:

f	forward fuselage
l	longitudinal
n	nose
t	tail
w	wing
wl	wing-left
wr	wing-right

In the text and on the computer plots of the waveforms, the rate of change of a quantity is indicated by a dot over the symbol-e.g., $\dot{B}_1$

INTRODUCTION

This report presents the wideband direct-strike lightning data obtained from the digital transient recorders during the 1984 Lightning Flight Tests of the NASA Langley Research Center lightning-instrumented F-106B aircraft. There were 247 strikes to the aircraft during this campaign; there were 10 strikes in each of the 1980 and 1981 tests which were reported in references 1 and 2, and 156 strikes in 1982 which were reported in reference 3, and 214 strikes in 1983 which were reported in reference 4. The instrumentation system, transient recorders, external sensors, a summary overview of the previous tests and internal sensors and cables are described in references 5, 6, 7, 8, and 9, respectively.

DATA SYSTEMS

Data from seven external, wide-band, electromagnetic field sensors, three current sensors, and eight voltage and current sensors on internal aircraft cables was recorded with a twelve-channel, digital transient recorder configured to accomodate various combinations of these sensors. The external sensors (reference 7) and internal sensors (reference 9) demonstrate frequency response from near zero to 100MHz. Transmission lines connecting sensors to the recorder are 50-ohm coaxial cables, all properly terminated. Solid shield coaxial cable was used for long (15-20 feet) transmission lines in the aircraft, with some short lengths (less than 3 feet) of more flexible double-braid shielded cable used in close proximity to the sensors. The transmission lines, including coaxial cables, connectors, and power splitters, were tested for frequency response and the results are given in reference 9. The twelve transient recorder channels are configured in four units of three channels each. The available trigger options are: to trigger each unit of three channels from a separate data source, or to trigger any combination up to all channels from a single source, or to trigger all channels from any one of four

seperate sources. These options are available by using a special "fan-out" device (see figure 1). The transient recorder stores 65536 data samples for each channel with 8-bit resolution and selectable sample rates from 200MHz to 1.5625MHz (sample interval from 5 nanoseconds to 640 nanoseconds). The sample interval selected for each measurement, and trigger source for each channel is shown in table 1. Dynamic range for each measurement was established by using selected attenuators inserted in the transmission lines from sensors to the transient recorder. Post-season calibration of the attenuators showed a maximum uncertainty between +2.3dB and -2.6dB in the attenuation factor used to process the data.

1984 LIGHTNING DATA

The 1984 tests resulted in 247 direct strikes to the aircraft and 11 nearby flashes from storm penetration flights at flight levels generally above 20,000 feet for the first half of the season, and generally below 20,000 feet for the remainder of the season. Table 2 summarizes, by flight number, the 1984 data records acquired with the twelve-channel transient recorder. The entries under the various sensor headings are the run numbers of each 65536 sample record acquired with the transient recorder system for a lightning strike or nearby flash. (A run consists of all the trasient recorder data associated with a trigger from one lightning event.) Typically, a single dynamic sensor response was captured in memory for each channel of the transient recorder for a lightning strike or nearby flash and plots of these dynamic waveforms are presented with an expanded time scale in this report. Labeling on each plot indicates flight number, run number, trigger time, and a strike or nearby-flash code- e.g., S-001 or N-001, for each recorded event which can be used to correlate this data with other waveforms for the same event. A zero on the horizontal axis of the data plots indicates the trigger time of the transient recorder as it was triggered by the lightning event.

The minus values, on the horizontal axis, indicate pre-trigger time, while the positive values indicate post-trigger time. The correlation to other supporting data is through time of occurrence (trigger time) which is shown on the plot. The sign conventions established for the measurements shown in figure 2 indicates positive quantities in the direction of the arrows; the relation between the sign conventions of the variables D, B, and I and their derivatives are shown in the measurement polarity time history also in figure 2.

The external sensor locations on the aircraft are shown in figure 2, and the following labels identify the waveform plots for each sensor: I_n is the current measurement and $\dot{I}$ is the rate-of-change of current measurement in the pitot boom at location 1, $\dot{D}_f$ is the rate-of-change of electric flux density measurement at location 2, $\dot{B}_l$ is the rate-of-change of magnetic flux density measurement at location 6, $\dot{B}_{wl}$ is the rate-of-change of magnetic flux density measurement at location 8, $\dot{D}_{wl}$ is the rate-of-change of electric flux density measurement at location 9, $\dot{B}_{wr}$ is the rate-of-change of magnetic flux density measurement at location 10, $\dot{D}_{wr}$ is the rate-of-change of electric flux density measurement at location 11, $\dot{D}_t$ is the rate-of-change of electric flux density measurement at location 12, I_t is the current measurement between the vertical fin cap and aircraft structure at location 13. Voltage and current measurements on internal wires and cables are labeled and located in the aircraft as follows: V_w (or TP100) is a voltage measurement on an insulated, 18-gauge wire located in the leading edge of the left wing (see figure 3), V_{fa} is a voltage measurement on a shielded, 18-gauge wire in the forward fuselage (see figure 4), V_{fb} (or TP101) is a voltage measurement on an insulated, 18-gauge wire in the forward fuselage (see figure 4), V_{fc} (or TP102) is a voltage measurement on the center conductor of a coaxial cable in the forward fuselage (see figure 4), TP114 is a current measurement on the power cable for the

vertical fin position light (see figure 5), TP116 is a current measurement on a position light power cable in mid-fuselage (see figure 6), TP123 is a current measurement on the power cable to an aircraft radio, and TP125 is a current measurement on the shield of a coaxial antenna cable to the same radio (see figure 7). The voltages are measured at 50-ohm terminations at one end of the wires and cables, and the other end (shields also) are connected to aircraft structure. The currents are measured on functional aircraft cables.

Channel assignments for the twelve-channel transient recorder were changed six times during the season to acquire data from 18 sensors described above, and each configuration is shown in table 1. An operational problem with an integrator/amplifier signal conditioning component caused all data acquired on one channel of the transient recorder to be unusable. Consequently, data from only eleven transient recorder channels are presented in this report. Measurement ranges, recorder trigger thresholds, and recorder sampling intervals for each configuration are also shown in table 1. On flights 84-013 through 84-039, all transient recorder channels were triggered simultaneously by stimuli to the $\dot{D}_f$ sensor only. On flights 84-040 through 84-048, all channels were triggered by the first response above the trigger threshold of either $\dot{D}_f$ or $\dot{D}_t$, and on fights 84-049 through 84-052, all channels were triggered by the first response above the trigger threshold of either $\dot{D}_f$, $\dot{D}_t$, or $\dot{D}_{wr}$. The sample intervals shown in table 1 indicate that the 200MHz sample rate (5 nanosecond interval) was employed for the internal measurements to acquire data on high frequency resonances which were anticipated on internal conductors. External sensor data was sampled at 100MHz (10 nanosecond sample interval), which was appropriate for the fundamental resonant frequency associated with the longitudinal dimension of the aircraft structure (6-8 MHz) and several higher harmonic frequencies. A sample rate of 25MHz (40 nanosecond sample interval) was utilized for two magnetic field, and

subsequently, two current measurements to achieve a longer memory storage time (65536 samples and 40 nanosecond sample interval results in 2.621440 milliseconds memory length) to investigate multiple current impulses during a lightning strike to the aircraft.

Two battery powered peak-level recorders were used on the aircraft in 1984 to continuously monitor and record the maximum amplitude achieved by the $\dot{D}_f$ and $\dot{I}$ measurements for each flight through 84-048, and $\dot{D}_f$ and I_t measurements for the remaining flights (the results are shown in table 3). The maximum current recorded from the I_t sensor was 54,000 A and occurred on flight 84-049, and the maximum rate of change of current recorded from the $\dot{I}$ sensor was 19.38E+10 A/s and occurred on flight 84-036, and the largest peak level recorded for $\dot{D}_f$ was 75 A/m^2 on flight 84-048, although there were some "over-scales" (>97 A/m^2) indicated for $\dot{D}_f$ throughout the season.

CONCLUSION

The waveforms recorded in 1984 are a significant addition to the data set of simultaneously recorded currents and electromagnetic fields which have been acquired to study and define the aircraft/lightning interaction. The data presented in this paper is the first large data set of time correlated electromagnetic measurements from multiple points on the surface of the aircraft with 10 nanosecond time resolution. The 1984 data also includes voltage and current measurements on internal aircraft wires and cables. Data was acquired from lightning strikes to the aircraft between the altitudes of 15,000 and 39,000 feet. The bandwidth of the data system makes it possible to analyze electromagnetic data acquired on the surface of the aircraft at the aircraft fundamental resonant frequency and several higher harmonics. Accuracy of this data is limited by a maximum uncertainty between +2.3dB and -2.6dB in the value of attenuation used to establish transient recorder channel sensitivity.

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TABLE 1. 1984 LIGHTNING MEASUREMENT RANGES

FLIGHT NUMBER	SENSOR	FULL SCALE	SAMPLE INTERVAL	TRIGGER THRESHOLD
84-013 to -018	$\dot{B}_{wl}$	$\pm$930 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{B}_{wr}$	$\pm$930 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_t$	$\pm$10 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{I}$	$\pm$2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$
	$\dot{B}_l$	$\pm$1800 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wr}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wl}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_f$	$\pm$12 A/m^2	10 ns	$\pm$3.7 A/m^2
	V_{fb} TP101	$\pm$51 V	10 ns	triggered by $\dot{D}_f$
	I_n	$\pm$9100 A	10 ns	triggered by $\dot{D}_f$
	I_t	$\pm$9100 A	10 ns	triggered by $\dot{D}_f$
84-019 to -027	$\dot{B}_{wl}$	$\pm$930 T/s	40 ns	triggered by $\dot{D}_f$
	$\dot{B}_{wr}$	$\pm$930 T/s	40 ns	triggered by $\dot{D}_f$
	$\dot{D}_t$	$\pm$2.5 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{I}$	$\pm$2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$
	$\dot{B}_l$	$\pm$1800 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wr}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wl}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_f$	$\pm$12 A/m^2	10 ns	$\pm$3.7 A/m^2
	V_{fa}	$\pm$51 V	10 ns	triggered by $\dot{D}_f$
	I_n	$\pm$9100 A	10 ns	triggered by $\dot{D}_f$
	I_t	$\pm$9100 A	10 ns	triggered by $\dot{D}_f$
84-028 to -034	I_n	$\pm$16200 A	40 ns	triggered by $\dot{D}_f$
	I_t	$\pm$16200 A	40 ns	triggered by $\dot{D}_f$
	$\dot{D}_t$	$\pm$2.5 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{I}$	$\pm$2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$
	$\dot{B}_l$	$\pm$1800 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wr}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wl}$	$\pm$19 A/m^2	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_f$	$\pm$12 A/m^2	10 ns	$\pm$3.7 A/m^2
	V_w TP100	$\pm$51 V	10 ns	triggered by $\dot{D}_f$
	V_{fb} TP101	$\pm$51 V	10 ns	triggered by $\dot{D}_f$
	V_{fc} TP102	$\pm$2.6 V	10 ns	triggered by $\dot{D}_f$

TABLE 1 Continued

FLIGHT NUMBER	SENSOR	FULL SCALE	SAMPLE INTERVAL	TRIGGER THRESHOLD
84-035 to -039	I_n	±16200 A	40 ns	triggered by $\dot{D}_f$
	I_t	±16200 A	40 ns	triggered by $\dot{D}_f$
	$\dot{D}_t$	±2.5 A/m²	10 ns	triggered by $\dot{D}_f$
	$\dot{I}$	±2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$
	$\dot{B}_l$	±1800 T/s	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wr}$	±19 A/m²	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_{wl}$	±19 A/m²	10 ns	triggered by $\dot{D}_f$
	$\dot{D}_f$	±12 A/m²	10 ns	±3.7 A/m²
	V_w TP100	±51 V	5 ns	triggered by $\dot{D}_f$
	V_{fb} TP101	±51 V	5 ns	triggered by $\dot{D}_f$
	TP123	±14 V	5 ns	triggered by $\dot{D}_f$
84-040 to -048	I_n	±16200 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	I_t	±16200 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	$\dot{D}_t$	±2.8 A/m²	10 ns	±0.8 A/m²
	$\dot{I}$	±2.4E+11 A/S	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	$\dot{B}_l$	±1800 T/s	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	$\dot{D}_{wr}$	±19 A/m²	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	$\dot{D}_{wl}$	±19 A/m²	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	$\dot{D}_f$	±12 A/m²	10 ns	±3.7 A/m²
	V_w TP100	±26 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	V_{fb} TP101	±26 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
	TP123	±2.6 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$
84-049 to -050	I_n	±16200 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	I_t	±22800 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_t$	±2.8 A/m²	10 ns	±0.8 A/m²
	$\dot{I}$	±2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{B}_l$	±1800 T/s	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_{wr}$	±21 A/m²	10 ns	±6.2 A/m²
	$\dot{D}_{wl}$	±15 A/m²	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_f$	±12 A/m²	10 ns	±3.7 A/m²
	V_w TP100	±26 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	V_{fb} TP101	±26 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	TP123	±2.6 V	5 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$

TABLE 1 Concluded

FLIGHT NUMBER	SENSOR	FULL SCALE	SAMPLE INTERVAL	TRIGGER THRESHOLD
84-051 to -052	I_n	±16200 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	I_t	±22800 A	40 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_t$	±2.8 A/m²	10 ns	±0.8 A/m²
	$\dot{I}$	±2.4E+11 A/s	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{B}_l$	±1800 T/s	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_{wr}$	±21 A/m²	10 ns	±6.2 A/m²
	$\dot{D}_{wl}$	±15 A/m²	10 ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	$\dot{D}_f$	±12 A/m²	10 ns	±3.7 A/m²
	TP114	±0.26 V	* ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	TP116	±0.26 V	* ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$
	TP125	±0.26 V	* ns	triggered by $\dot{D}_f$ or $\dot{D}_t$ or $\dot{D}_{wr}$

* 5 ns for flight 84-051 and 10 ns for flight 84-052

TABLE 2. 1984 DATA SUMMARY FOR FLIGHTS 84-014 through 84-052

DATE	FLT NUM	NUM STKS	NUM NRBY	RUN NUMBERS $\dot{B}_{wl}$	$\dot{B}_{wr}$	$\dot{D}_t$	$\dot{I}$	$\dot{B}_l$	$\dot{D}_{wr}$	$\dot{D}_{wl}$	$\dot{D}_f$	101	I_n	I_t	PAGE NUMB
5/27	014	2	0	---	---	1-2	1-2	1-2	---	1-2	1-2	1-2	1-2	1-2	22-37
5/27	015	6	2	1-5	---	1-5	1-5	1-5	---	1-5	1-5	1-5	1-5	1-5	38-73
5/28	017	2	0	1	---	1	1	1	---	1	1	1	1	1	74-82
(SENSOR CHANGE)				$\dot{B}_{wl}$	$\dot{B}_{wr}$	$\dot{D}_t$	$\dot{I}$	$\dot{B}_l$	$\dot{D}_{wr}$	$\dot{D}_{wl}$	$\dot{D}_f$	V_{fa}	I_n	I_t	
6/5	019	10	0	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	83-148
6/6	020	7	1	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	1,3-8	149-225
6/7	021	3	1	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	226-258
6/11	023	3	0	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	259-280
6/12	024	7	3	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	1,3-7	281-348
6/13	025	19	1	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15	1-15	349-509
6/14	026	5	0	---	---	---	---	---	---	---	---	---	---	---	
6/14	027	5	1	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	510-542
(SENSOR CHANGE)				I_n	I_t	$\dot{D}_t$	$\dot{I}$	$\dot{B}_l$	$\dot{D}_{wr}$	$\dot{D}_{wl}$	$\dot{D}_f$	100	101	102	
6/28	028	6	0	4,5	4,5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	543-591
6/29	029	3	0	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	592-612
7/7	031	2	0	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	613-634
7/7	032	5	0	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	635-666
7/10	033	14	1	---	---	1-4	1-4	1-4	---	---	---	---	---	---	667-678

TABLE 2 Concluded

RUN NUMBERS

DATE	FLT NUM	NUM STKS	NUM NRBY	I_n	I_t	$\dot{D}_t$	$\dot{I}$	$\dot{B}_l$	$\dot{D}_{wr}$	$\dot{D}_{wl}$	$\dot{D}_f$	100	101	123	PAGE NUMB
7/16	035	7	0	1-5	1-5	1-5	1-5	1-5	---	---	---	1-5	1-5	1-5	679-718
7/24	036	9	0	1-6	1-6	1-6	1-6	1-6	2-6	1-6	1-6	1-6	1-6	1-6	719-783
7/25	037	72	0	1-10 12-20	1-10 12-20	1-10 12-20	1-10 12-20	1-10 12-20	1,3-10 12-20	1-10 12-20	1-10 12-20	2-10 12-20	1-10 12-20	1-10 12-20	784-981
7/27	038	2	0	1	1	1	1	1	---	1	1	1	1	1	982-991
8/8	043	6	0	1-6	1-6	1-6	1-6	1-6	---	---	---	1-6	1-6	1-6	992-1039
8/9	044	6	0	1-4	2-4	1-4	1-4	2-4	---	---	---	1-4	1-4	2-4	1040-1068
8/9	045	3	0	1-3	1-3	1-3	1-3	1-3	---	---	---	1-3	1-3	1-3	1069-1092
(SENSOR CHANGE) 8/12	046	2	0	$\frac{I_n}{1-2}$	$\frac{I_t}{1-2}$	$\frac{\dot{D}_t}{1-2}$	$\frac{\dot{B}_l}{1-2}$	$\frac{\dot{I}}{1-2}$	$\frac{\dot{D}_{wr}}{1-2}$	$\frac{\dot{D}_{wl}}{1-2}$	$\frac{\dot{D}_f}{---}$	$\frac{100}{1-2}$	$\frac{101}{1-2}$	$\frac{123}{1-2}$	1093-1112
(SENSOR CHANGE) 8/13	047	5	0	$\frac{I_n}{1-4}$	$\frac{I_t}{1-4}$	$\frac{\dot{D}_t}{1-4}$	$\frac{\dot{B}_l}{1-4}$	$\frac{\dot{I}}{1-4}$	$\frac{\dot{D}_f}{1-4}$	$\frac{\dot{D}_{wl}}{1-4}$	$\frac{\dot{D}_{wr}}{---}$	$\frac{100}{1-4}$	$\frac{101}{1-4}$	$\frac{123}{---}$	1113-1148
8/14	048	5	1	1-5	1-5	1-3,5	1-5	1-5	---	1-5	---	1-3,5	1-5	1-5	1149-1191
(SENSOR CHANGE) 8/23	049	1	0	$\frac{I_n}{1}$	$\frac{I_t}{1}$	$\frac{\dot{D}_t}{1}$	$\frac{\dot{I}}{1}$	$\frac{\dot{B}_l}{1}$	$\frac{\dot{D}_{wr}}{1}$	$\frac{\dot{D}_{wl}}{1}$	$\frac{\dot{D}_f}{1}$	$\frac{100}{1}$	$\frac{101}{1}$	$\frac{123}{1}$	1192-1202
8/30	050	28	0	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	1-10	---	1-10	1203-1312
(SENSOR CHANGE) 9/13	051	1	0	$\frac{I_n}{1}$	$\frac{I_t}{1}$	$\frac{\dot{D}_t}{1}$	$\frac{\dot{I}}{1}$	$\frac{\dot{B}_l}{1}$	$\frac{\dot{D}_{wr}}{1}$	$\frac{\dot{D}_{wl}}{1}$	$\frac{\dot{D}_f}{1}$	$\frac{114}{1}$	$\frac{116}{1}$	$\frac{125}{1}$	1313-1323
10/18	052	2	0	1,2	1,2	1,2	---	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1324-1343

TABLE 3. 1984 DATA SUMMARY-PEAK LEVELS

DATE	FLIGHT NUMBER	NUMBER OF STRIKES	NUMBER OF NEAR-BY	PEAK LEVELS RECORDED $\dot{D}_f$	$\dot{I}$	I_t
5/27	84-014	2	0	*	*	
5/27	84-015	6	2	37 A/m²	.38E+10 A/s	
5/28	84-017	2	0	*	*	
6/5	84/019	10	0	*	*	
6/6	84-020	7	1	**	7.79E+10 A/s	
6/7	84-021	3	1	0	0	
6/11	84-023	3	0	40 A/m²	.19E+10 A/s	
6/12	84-024	7	3	37 A/m²	3.04E+10 A/s	
6/13	84-025	19	1	39 A/m²	1.71E+10 A/s	
6/14	84-026	5	0	40 A/m²	4.37E+10 A/s	
6/14	84-027	5	1	28 A/m²	4.75E+10 A/s	
6/28	84-028	6	0	40 A/m²	1.52E+10 A/s	
6/29	84-029	3	0	31 A/m²	.19E+10 A/s	
7/7	84-031	2	0	26 A/m²	0	
7/7	84-032	5	0	28 A/m²	1.14E+10 A/s	
7/10	84-033	14	1	*	*	
7/16	84-035	7	0	30 A/m²	.57E+10 A/s	
7/24	84-036	9	0	44 A/m²	19.38E+10 A/s	
7-25	84-037	72	0	**	5.32E+10 A/s	
7/27	84-038	2	0	23 A/m²	3.99E+10 A/s	
8/8	84-043	6	0	**	11.02E+10 A/s	
8/9	84-044	6	0	17 A/m²	16.15E+10 A/s	
8/9	84-045	3	0	28 A/m²	7.79E+10 A/s	
8/12	84-046	2	0	7 A/m²	8.74E+10 A/s	
8/13	84-047	5	0	28 A/m²	6.08E+10 A/s	
8/14	84-048	5	1	75 A/m²	12.73E+10 A/s	
8/23	84-049	1	0		9.69E+10 A/s	54KA
8/30	84-050	27	0		17.48E+10 A/s	44KA
9/13	84-051	1	0		8.17E+10 A/s	*
10/18	84-052	2	0		8.36E+10 A/s	*

* Peak Detector inoperative
** Off-scale reading

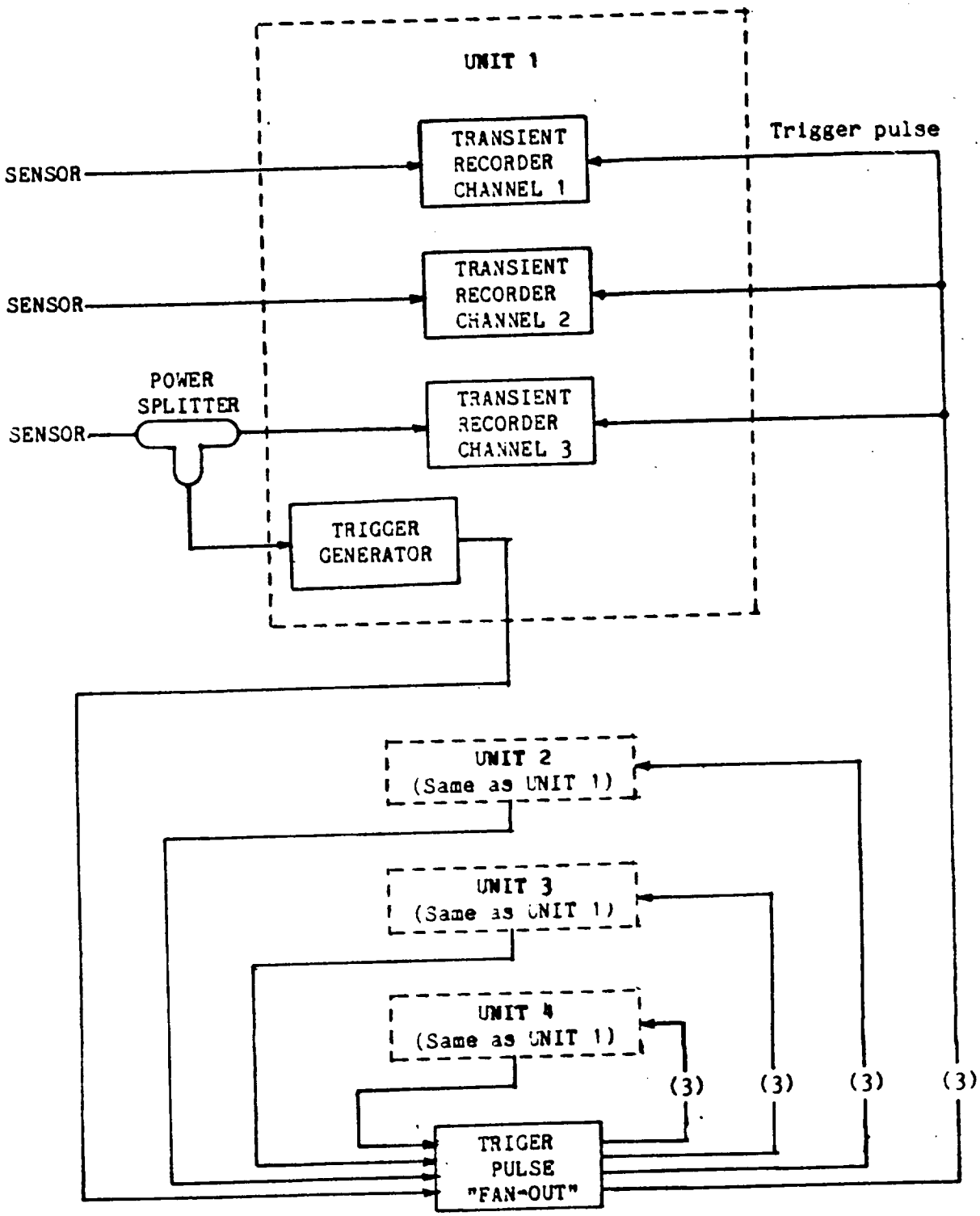

FIGURE 1. Transient Recorder Trigger Configuration

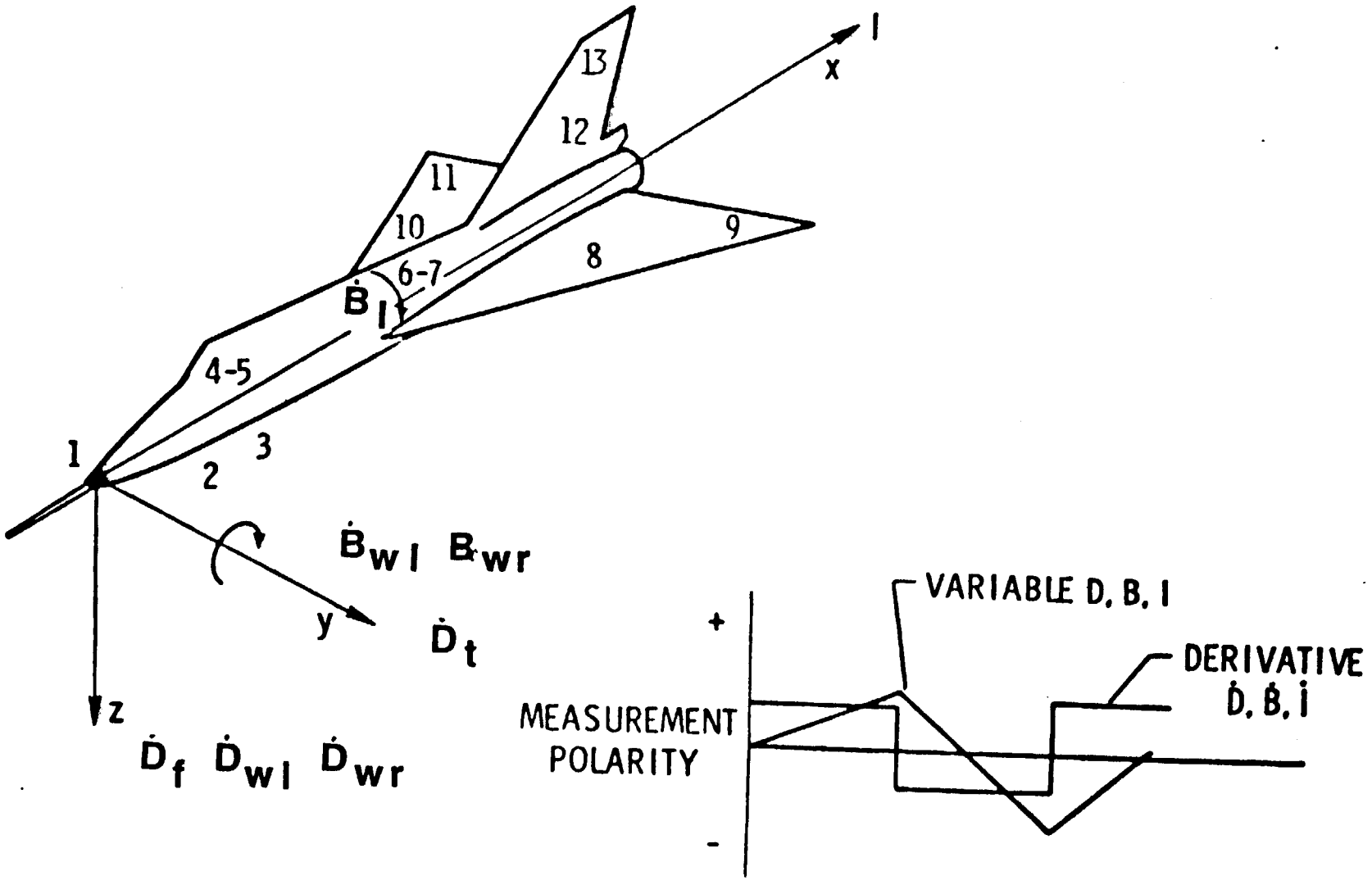

Figure 2. - Electromagnetic sign conventions and sensor locations.

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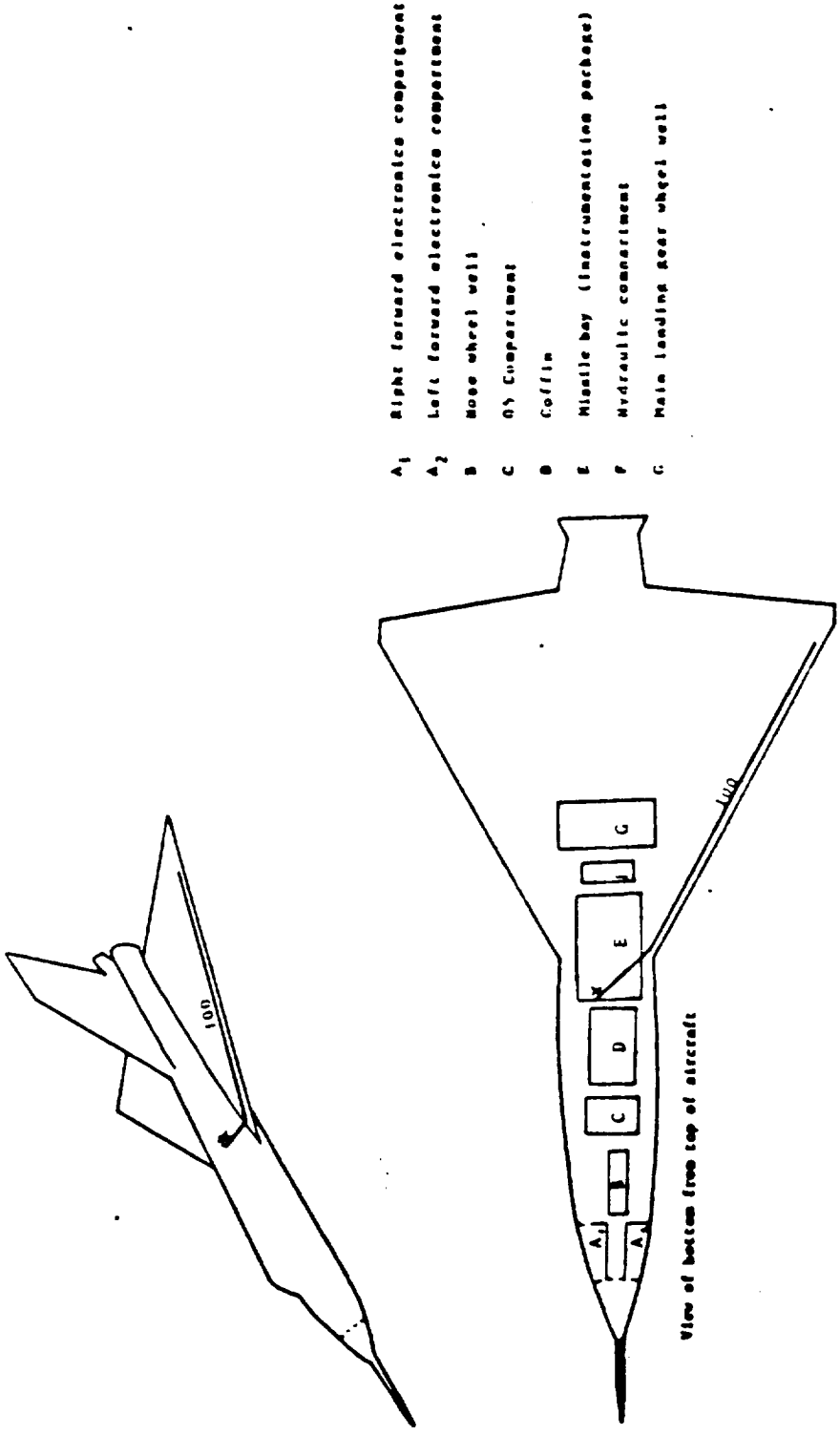


Figure 3. TP 100

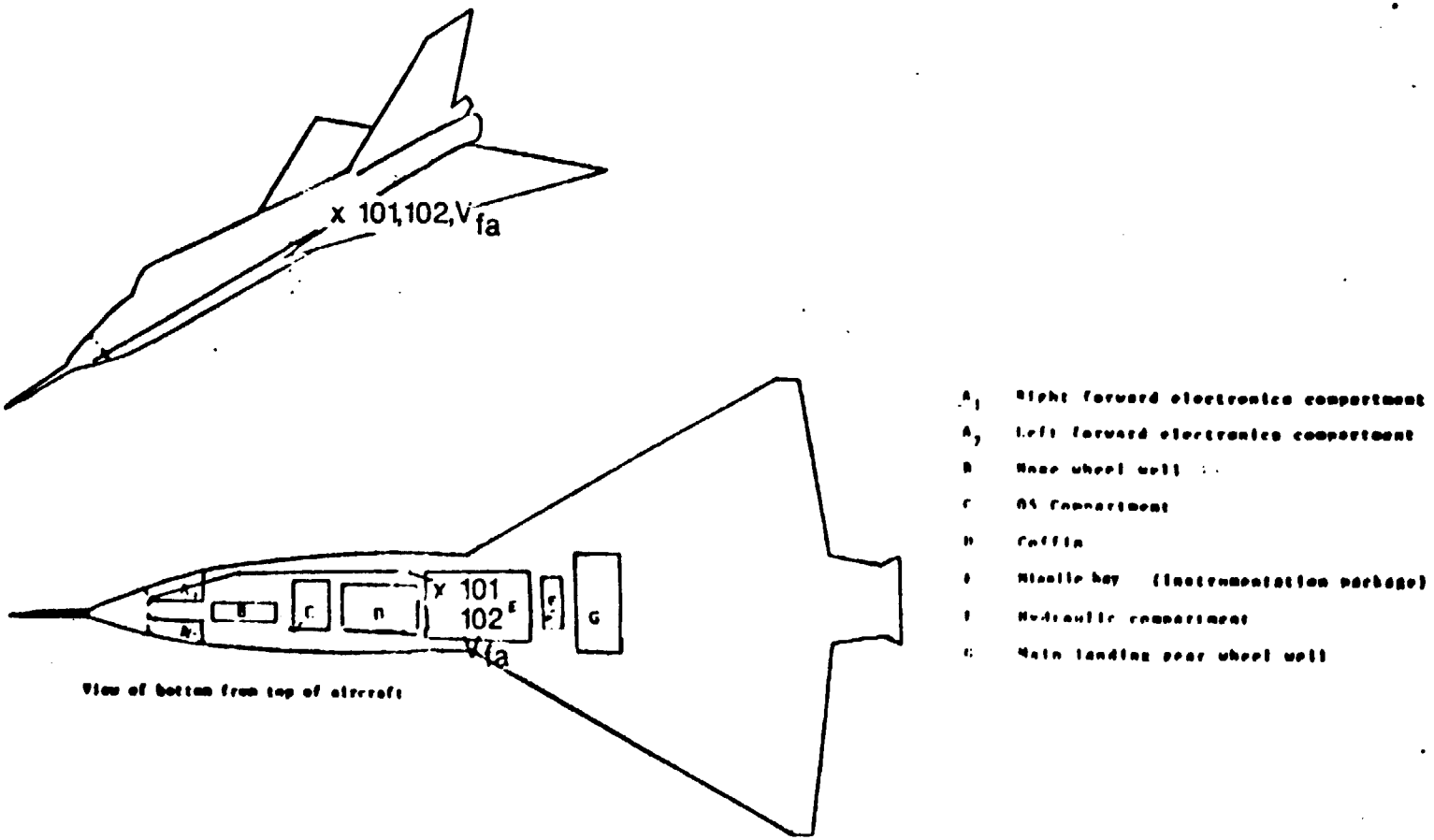
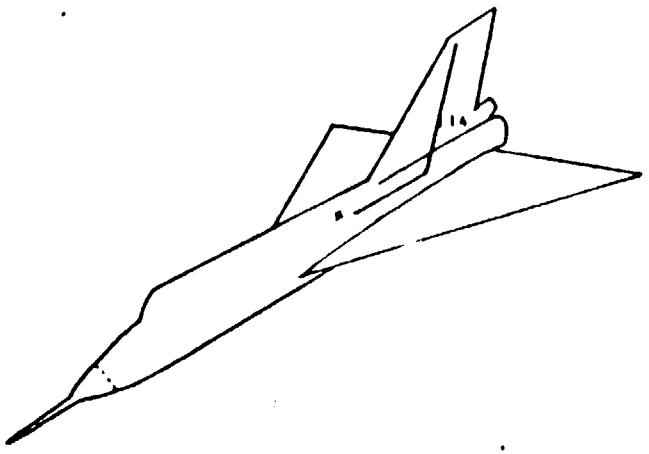
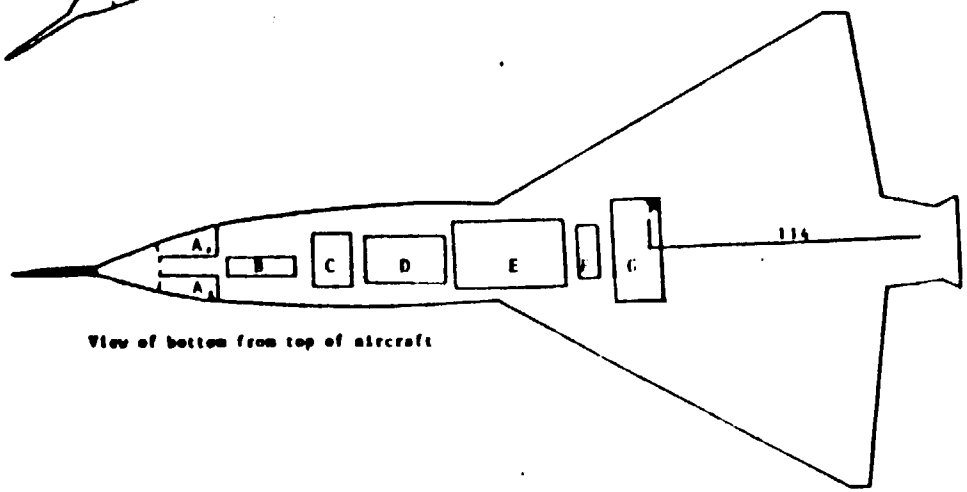


Figure 4. TP 101, 102, and V_{fa}





View of bottom from top of aircraft

A_1 Right forward electronics compartment
A_2 Left forward electronics compartment
B Nose wheel well.
C OS Compartment
D Cuffia
E Missile bay (instrumentation package)
F Hydraulic compartment
G Main landing gear wheel well

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Figure 5. TP 114

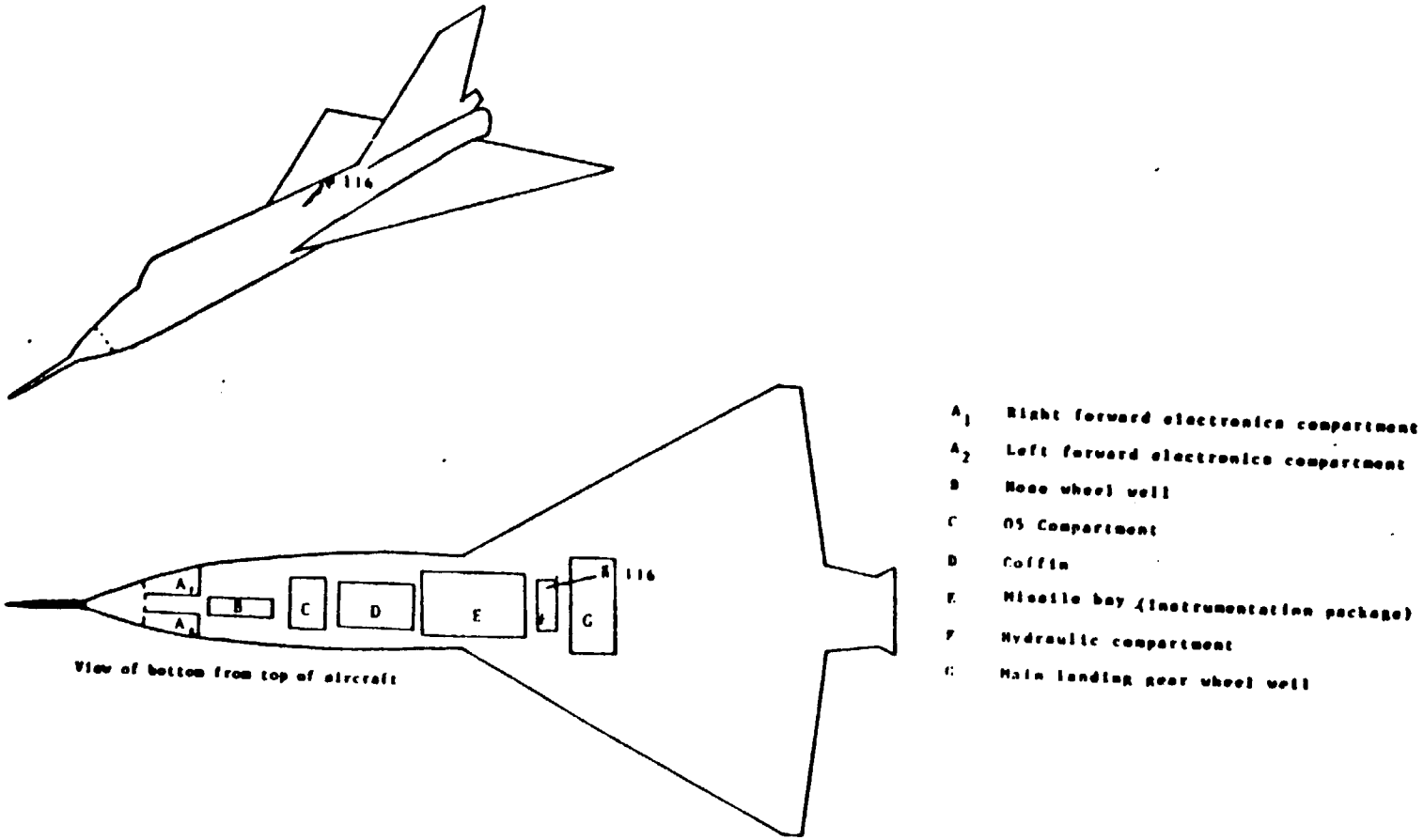

Figure 6. TP 116

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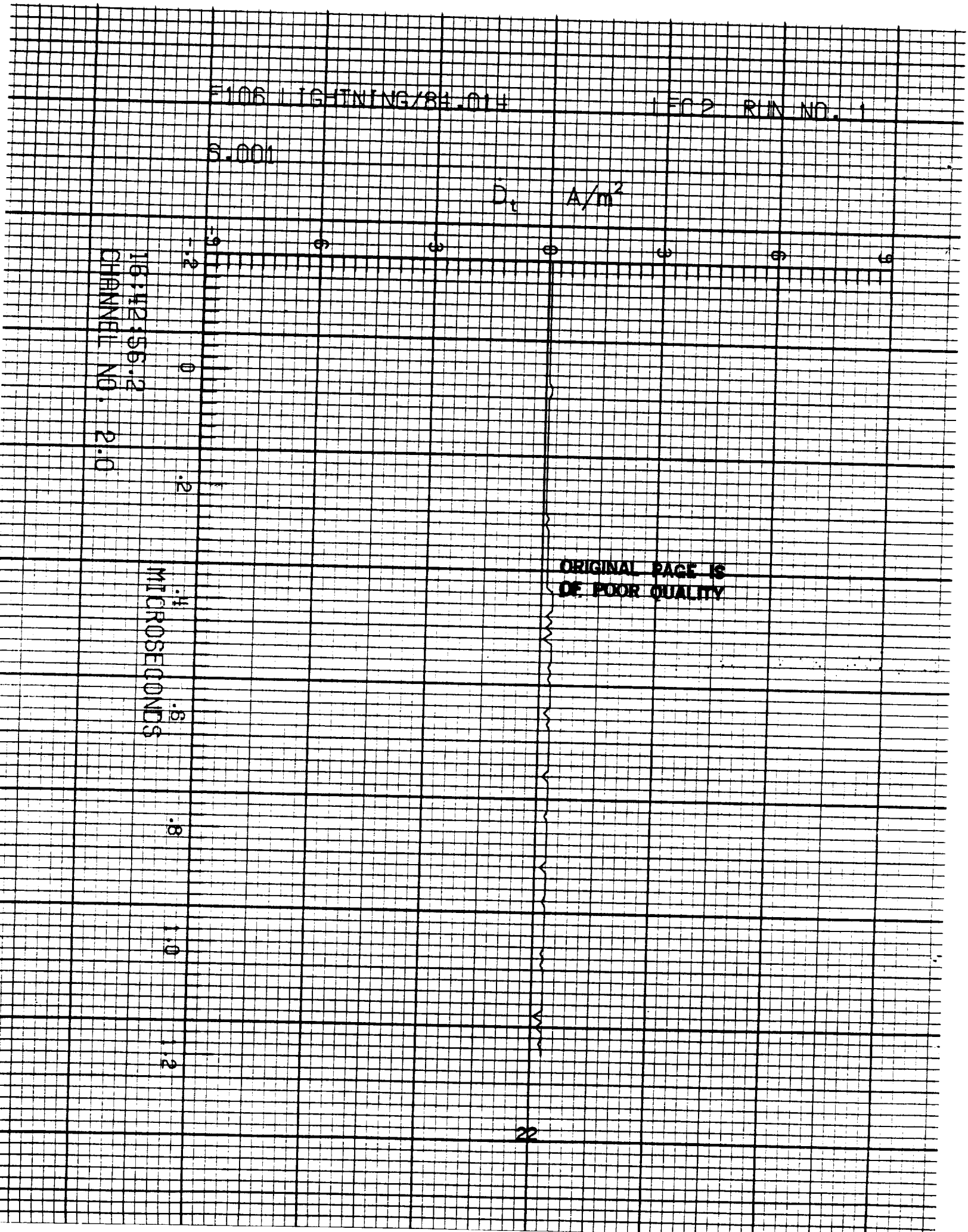
Figure 7. TP 123 and TP 125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LEC2 RUN NO. 1
S.001
$\dot{D}_t$ A/m^2
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-6
-3
0
3
6
9
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
16:42:56.2
CHANNEL NO. 2.0
ORIGINAL PAGE IS
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ORIGINAL PAGE IS
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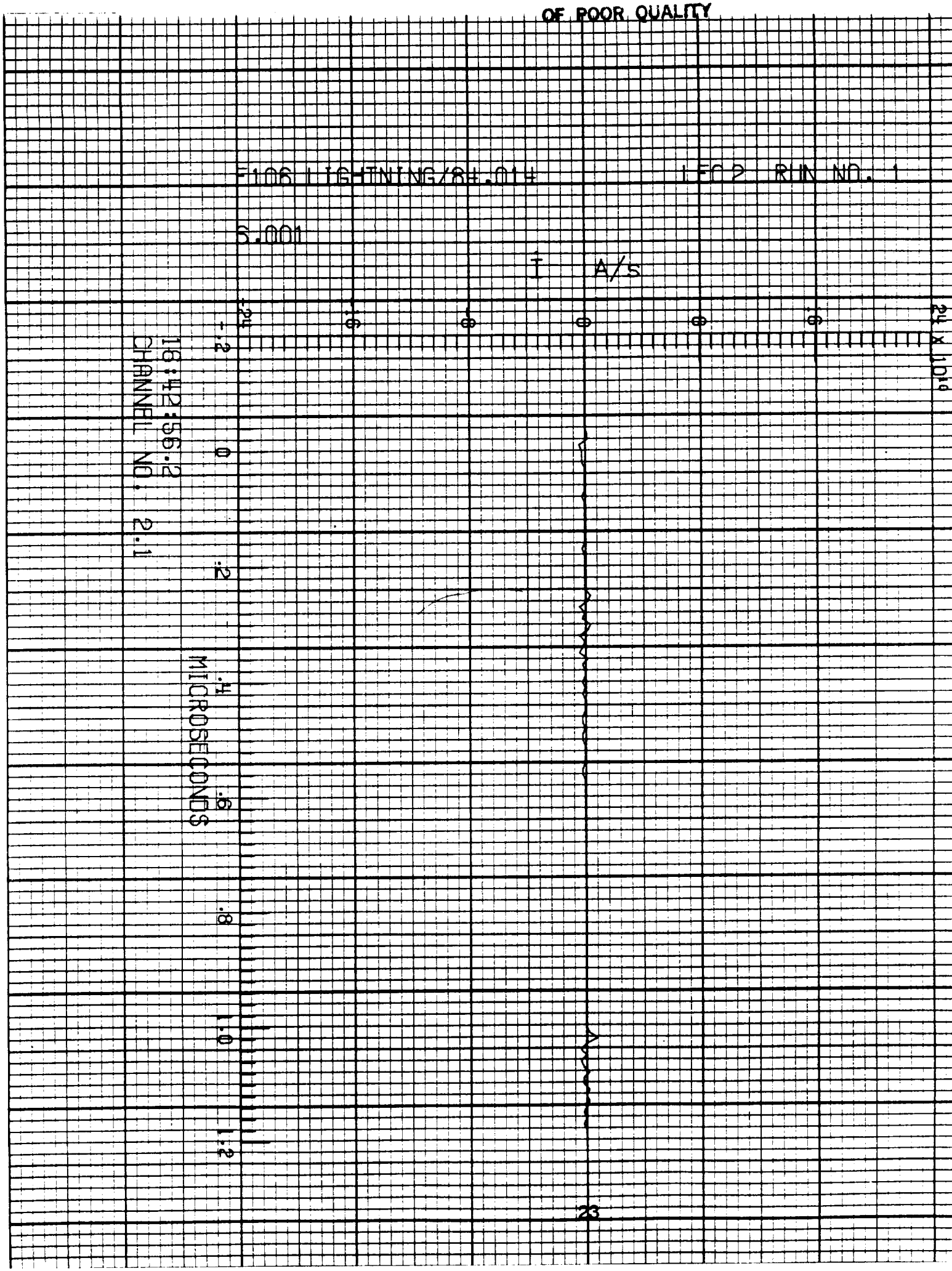

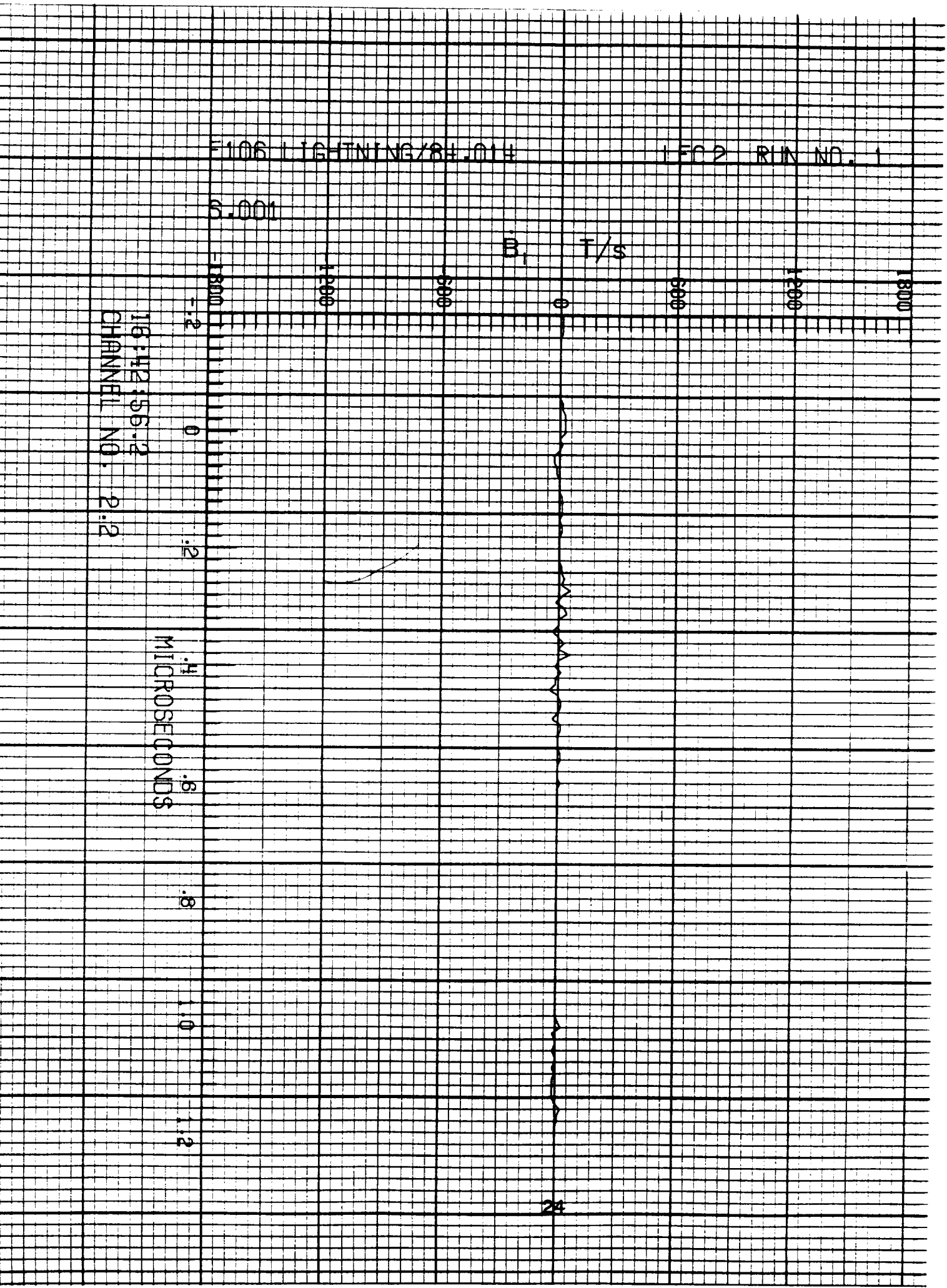
F106 LIGHTNING/84.014
LFC2 RUN NO. 1
6.001
$\dot{B}_1$ T/s
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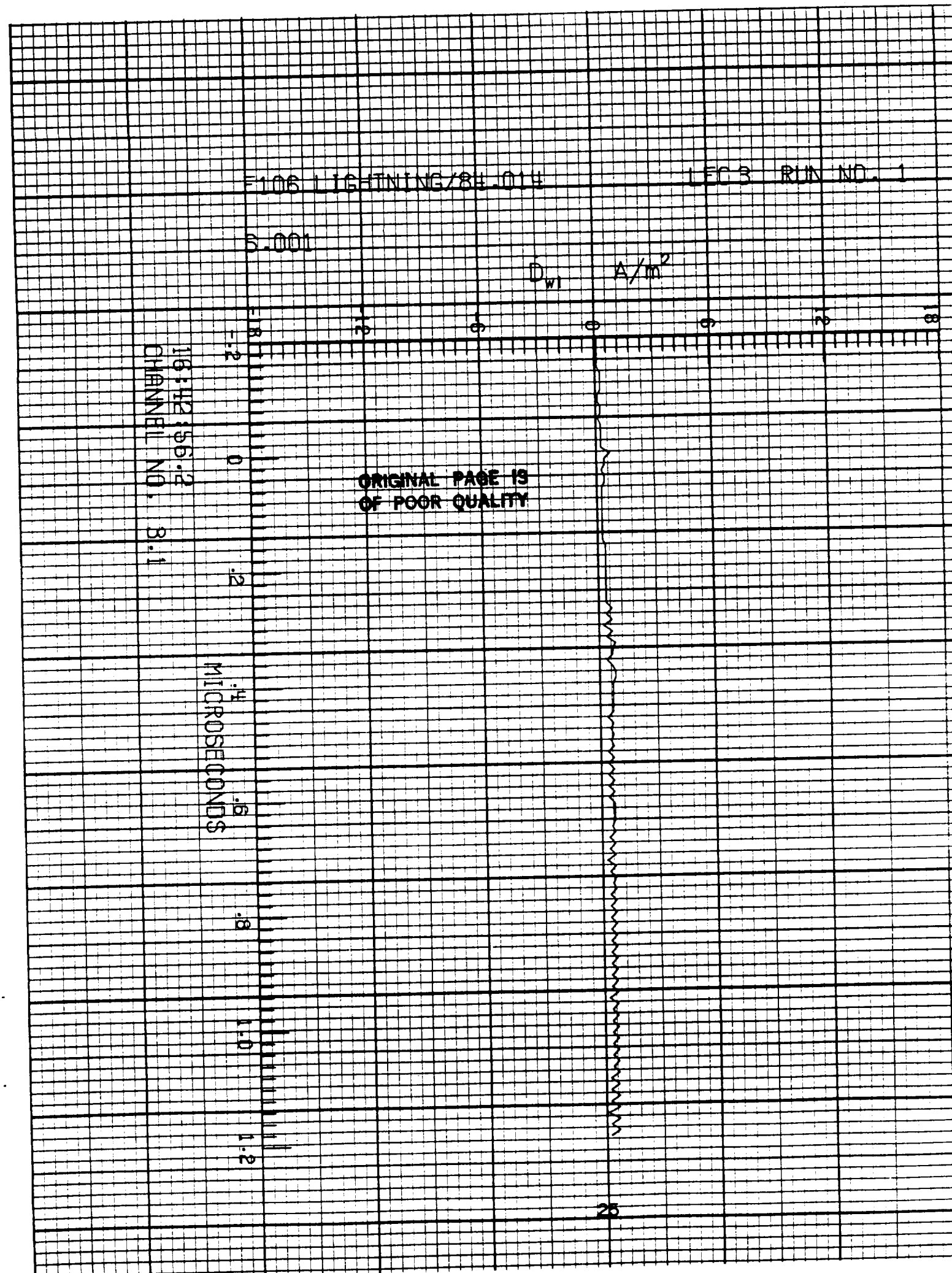
-1200
-600
0
600
1200
1800
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
16:42:56.2
CHANNEL NO. 2.2



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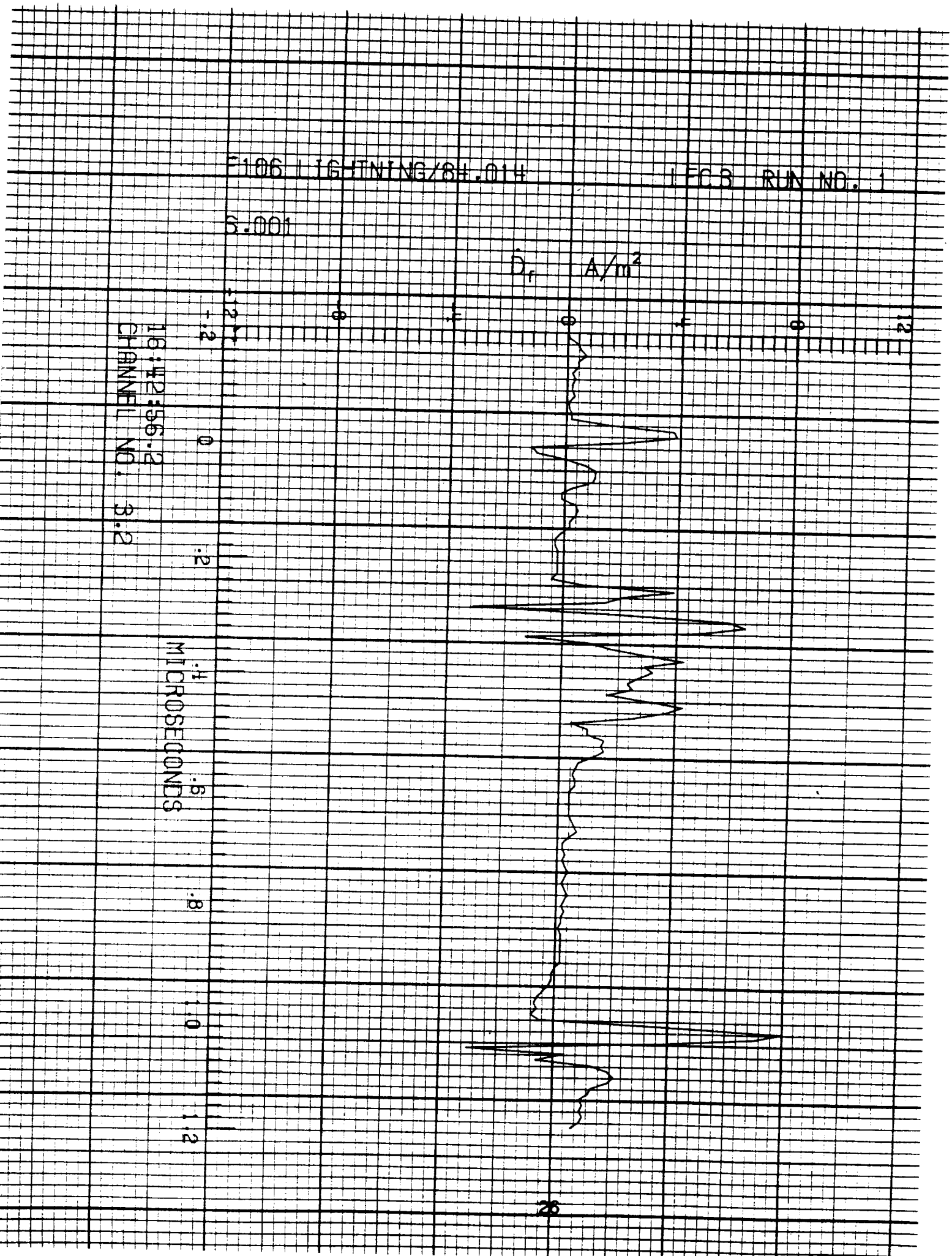
F106 LIGHTNING/84.014
LFC3 RUN NO. 1
S.001
$\dot{D}_f$ A/m^2
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-8
-4
0
4
8
12
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
16:42:56.2
CHANNEL NO. 3.2

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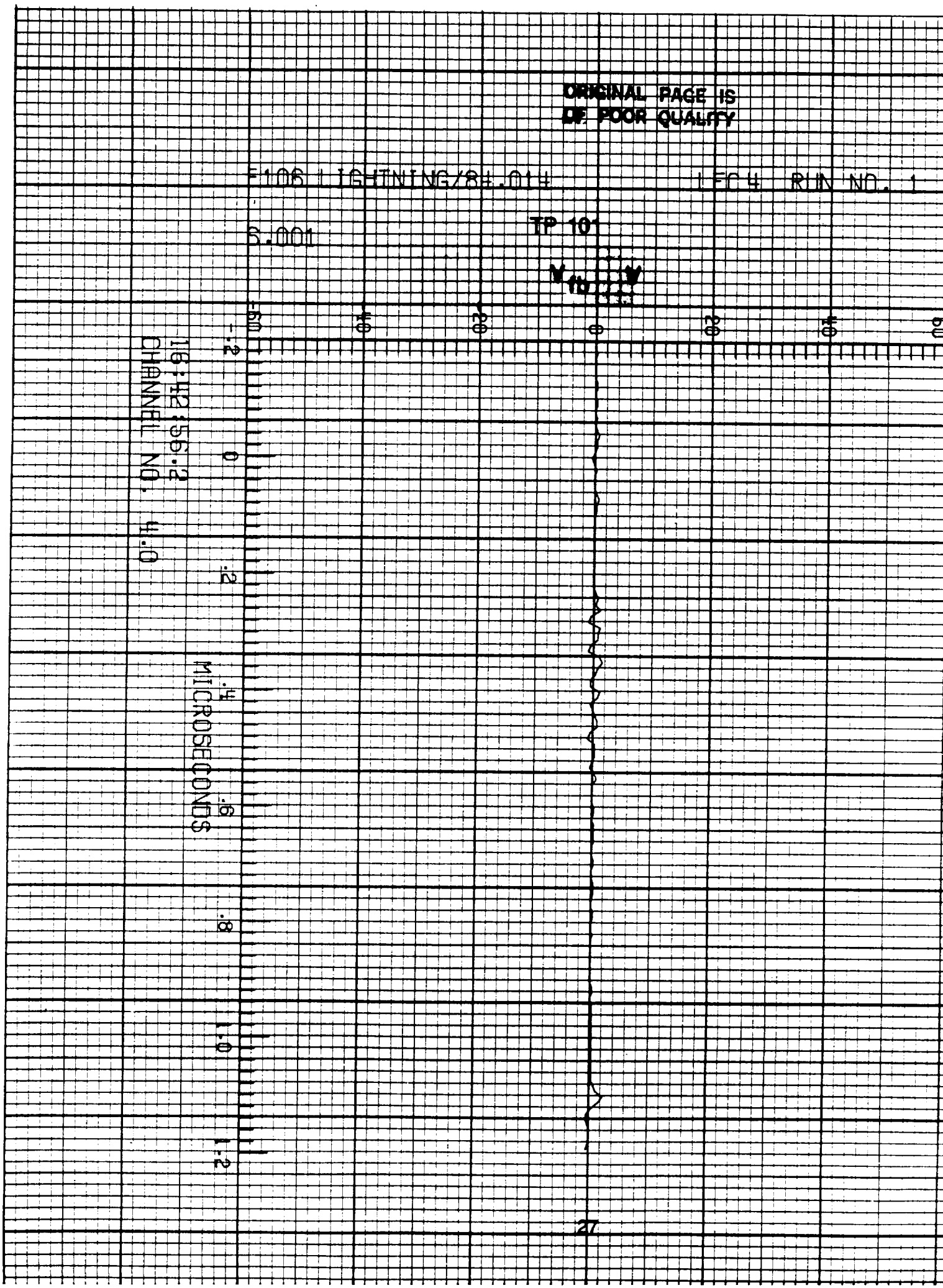

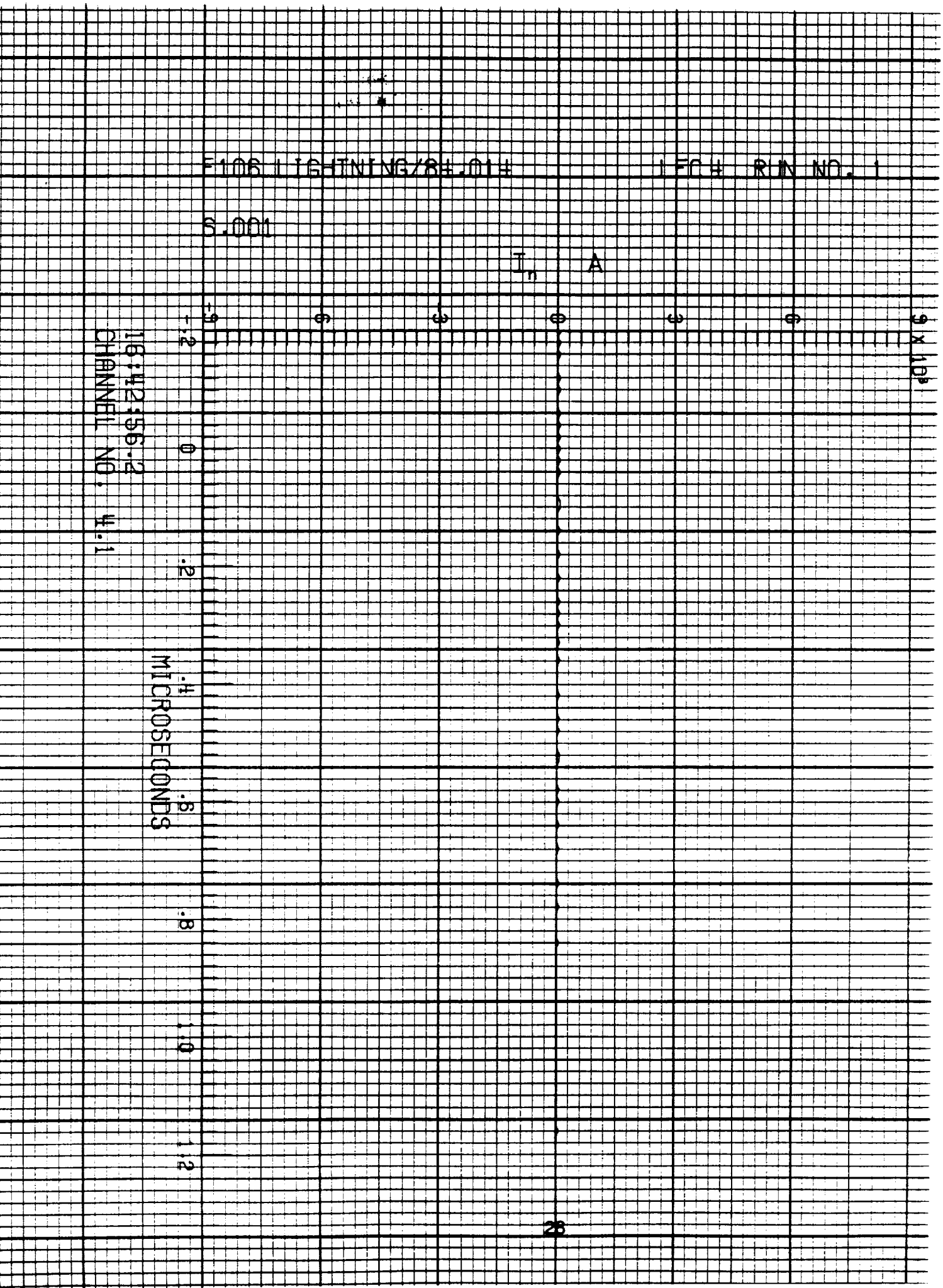
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LFC4 RUN NO. 1
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-6
-3
0
3
6
9 x 10³
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
16:42:56.2
CHANNEL NO. 4.1

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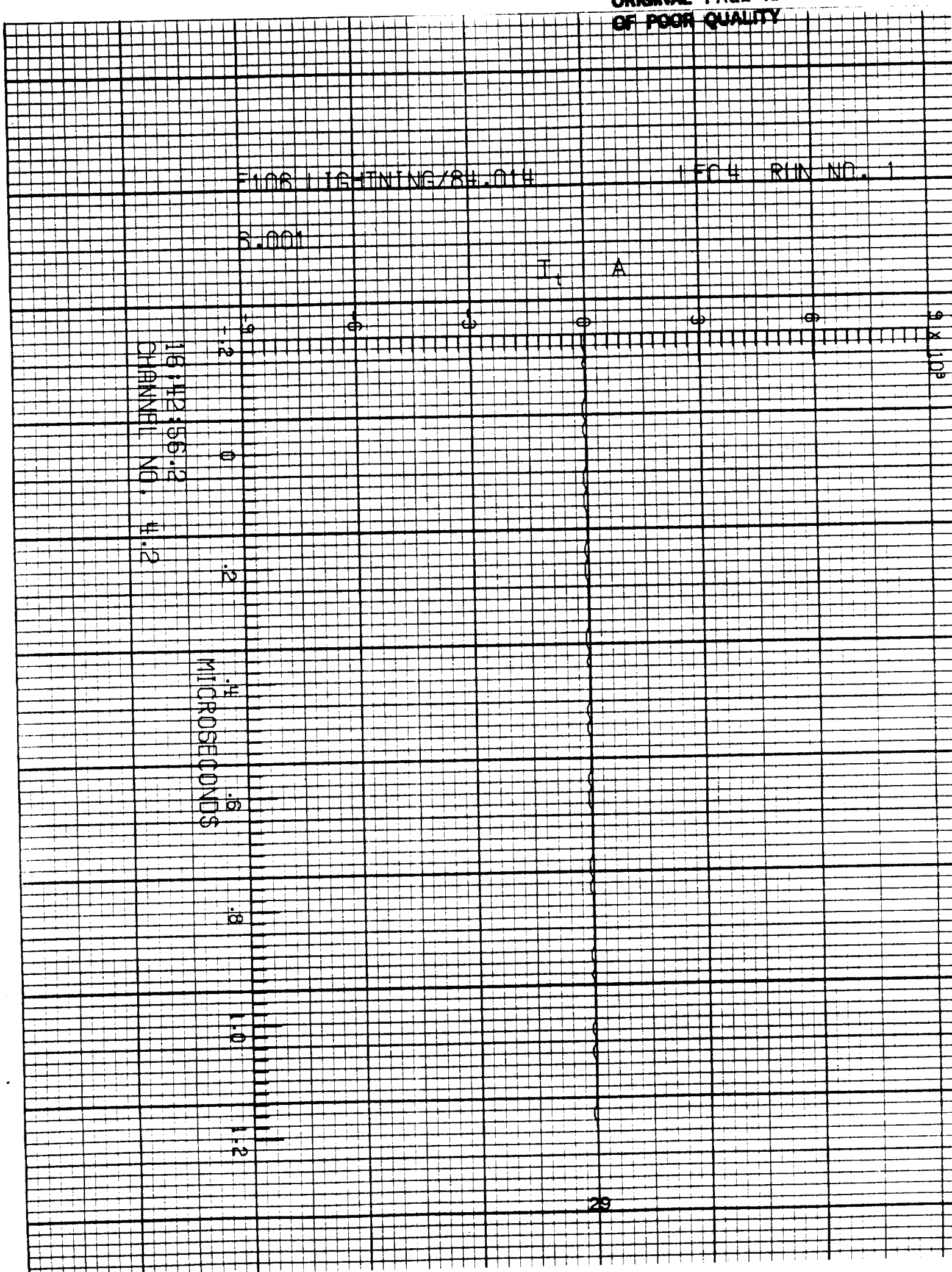

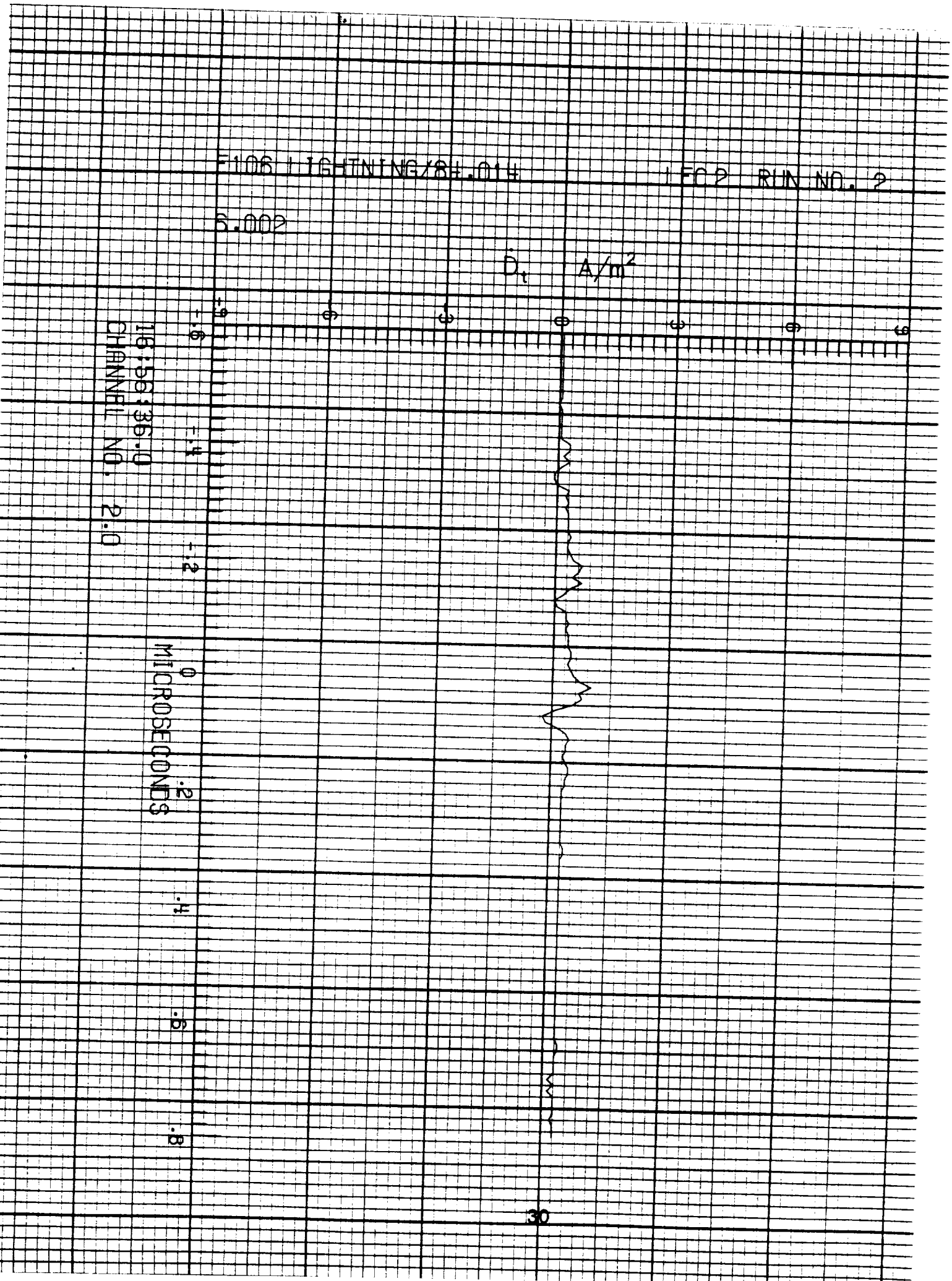
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LEC2 RUN NO. 2
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$\dot{D}_t$ A/m^2
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-6
-3
0
3
6
9
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
16:56:36.0
CHANNEL NO. 2.0

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F106 LIGHTNING/84-014 LFC2 RUN NO. 2

5.002

I A/S

24 x 10^{10}

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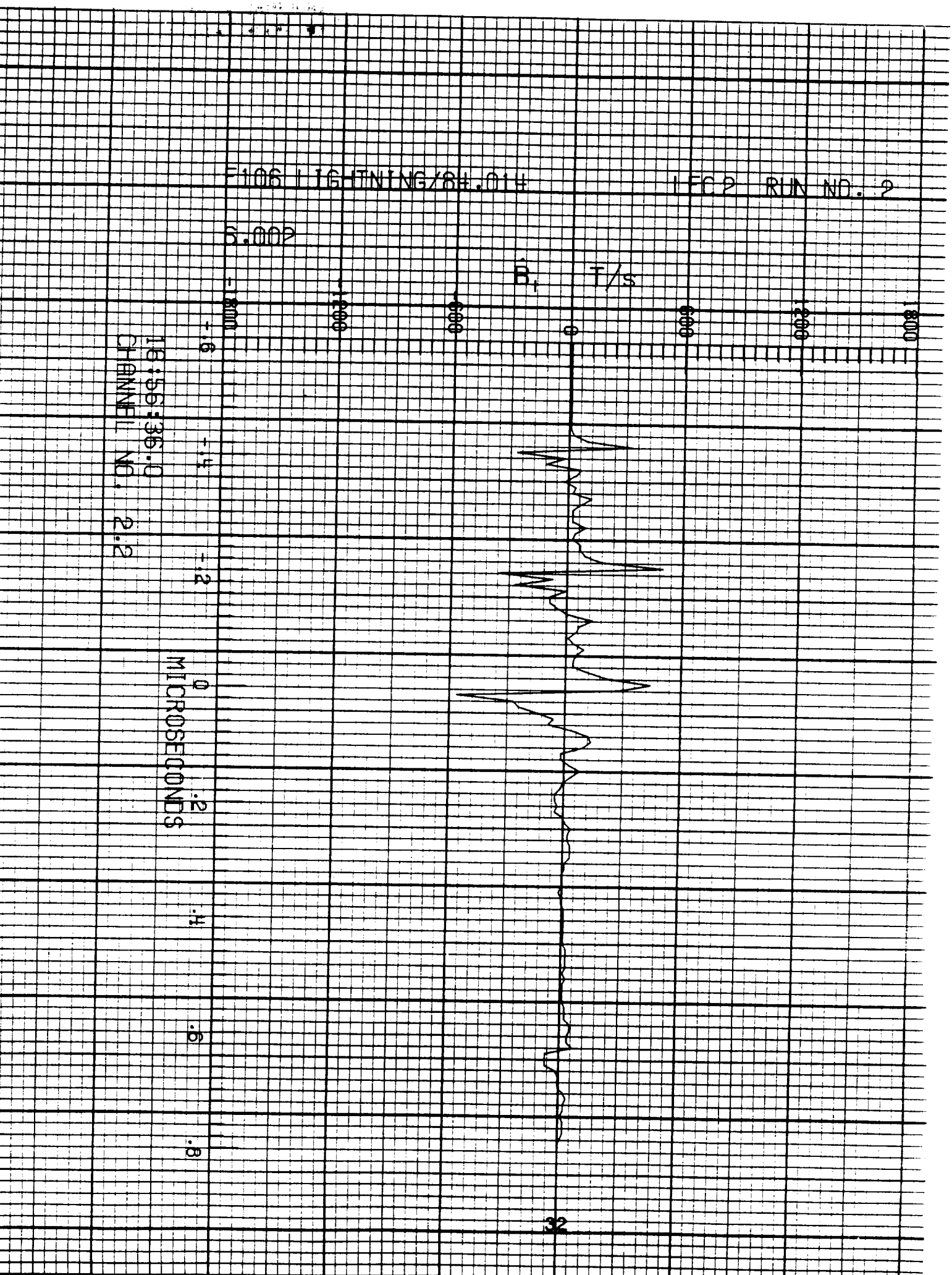
-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

16:56:36.0
CHANNEL NO. 2:1


F106 LIGHTNING/84.014
LFC2 RUN NO. 2
6.002
$\dot{B}_1$ T/s
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-1200
-600
0
600
1200
1800
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
16:56:36.0
CHANNEL NO. 2.2

ORIGINAL PAGE IS
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F106 LIGHTNING/84-014 IFC 3 RUN NO. 2

6.002

D_{w1} A/m^2

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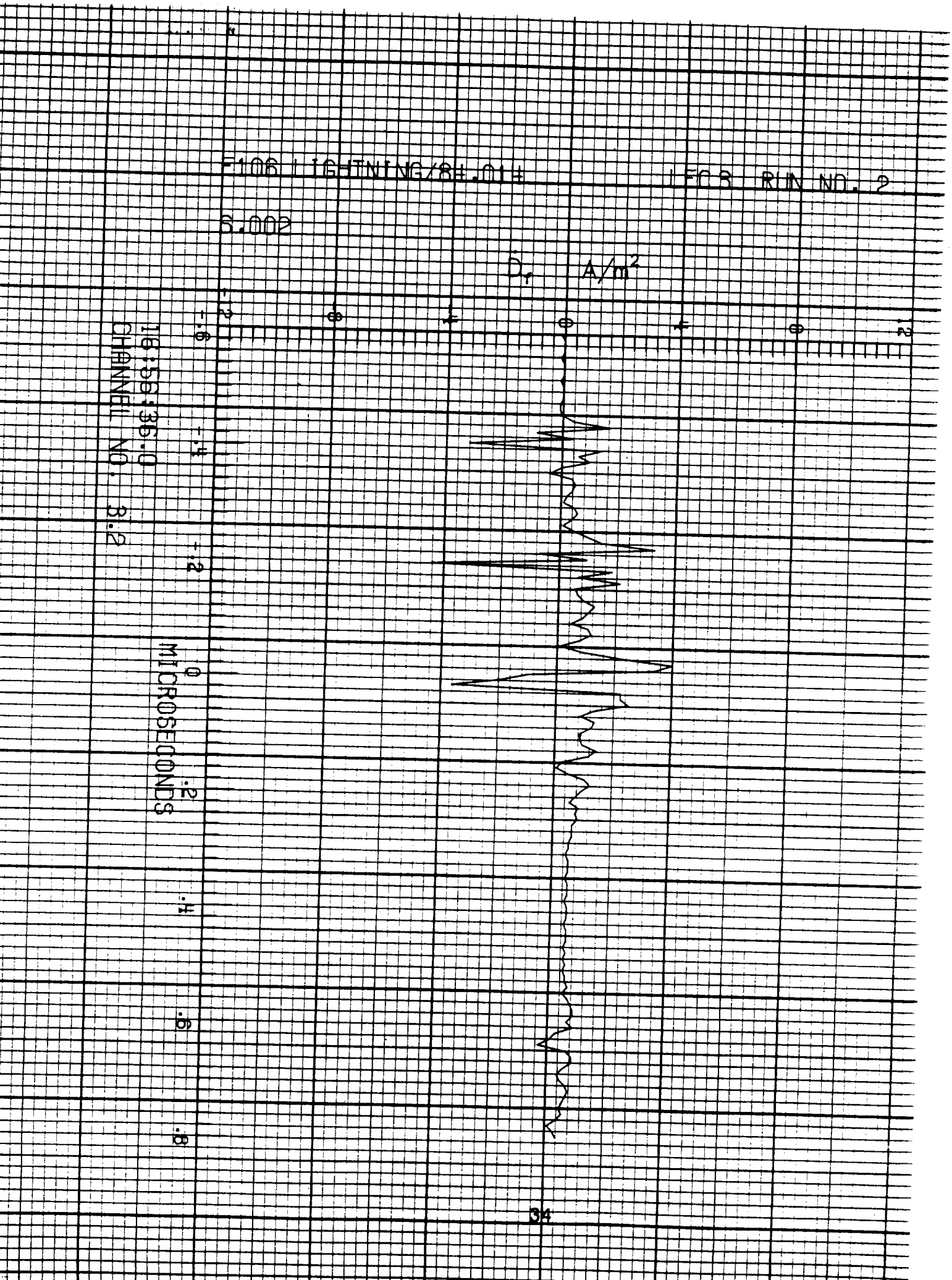
MICROSECONDS

16:56:36.0

CHANNEL NO. R.1


F106 LIGHTNING/84.014
LFC3 RUN NO. 2
S.002
$\dot{D}_f$ A/m^2
-.2
-.8
-.4
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.4
.8
.2
-.6
-.4
-.2
0
.2
.4
.6
.8
16:56:36.0
CHANNEL NO. 3.2
MICROSECONDS

ORIGINAL PAGE IS
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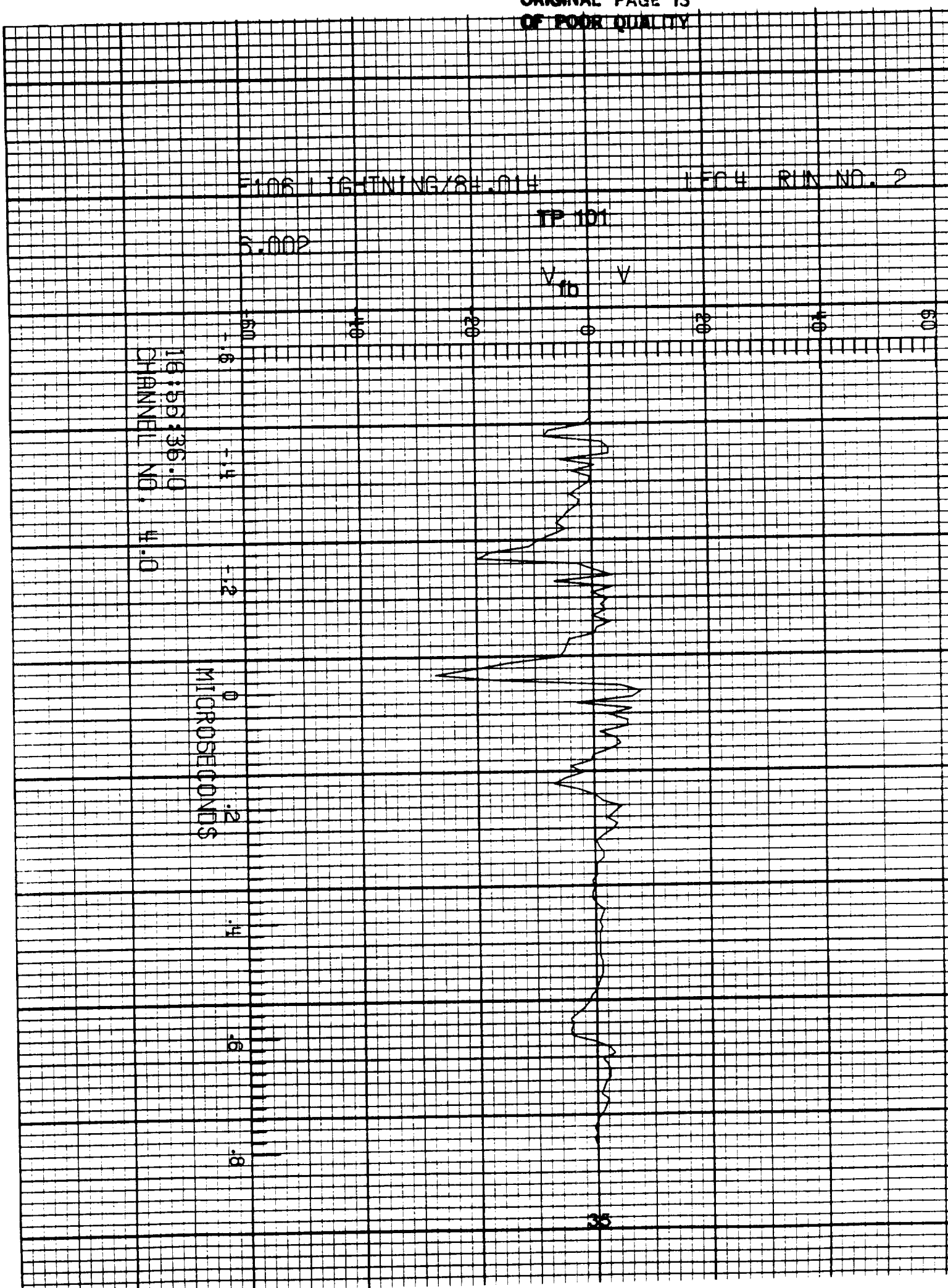

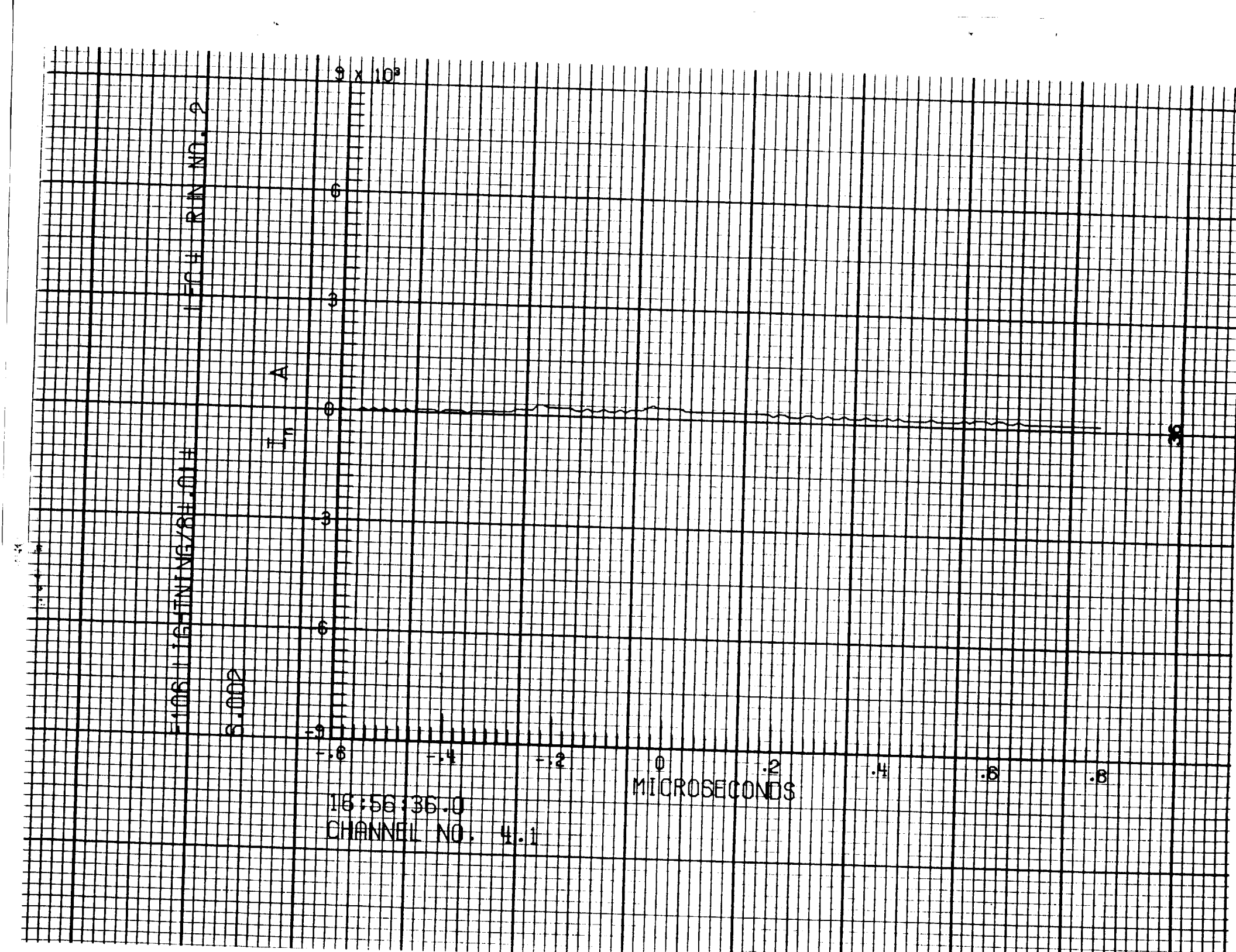
9 x 10³
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3
0
-3
-6
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
16:56:36.0
CHANNEL NO. 4.1

ORIGINAL PAGE IS
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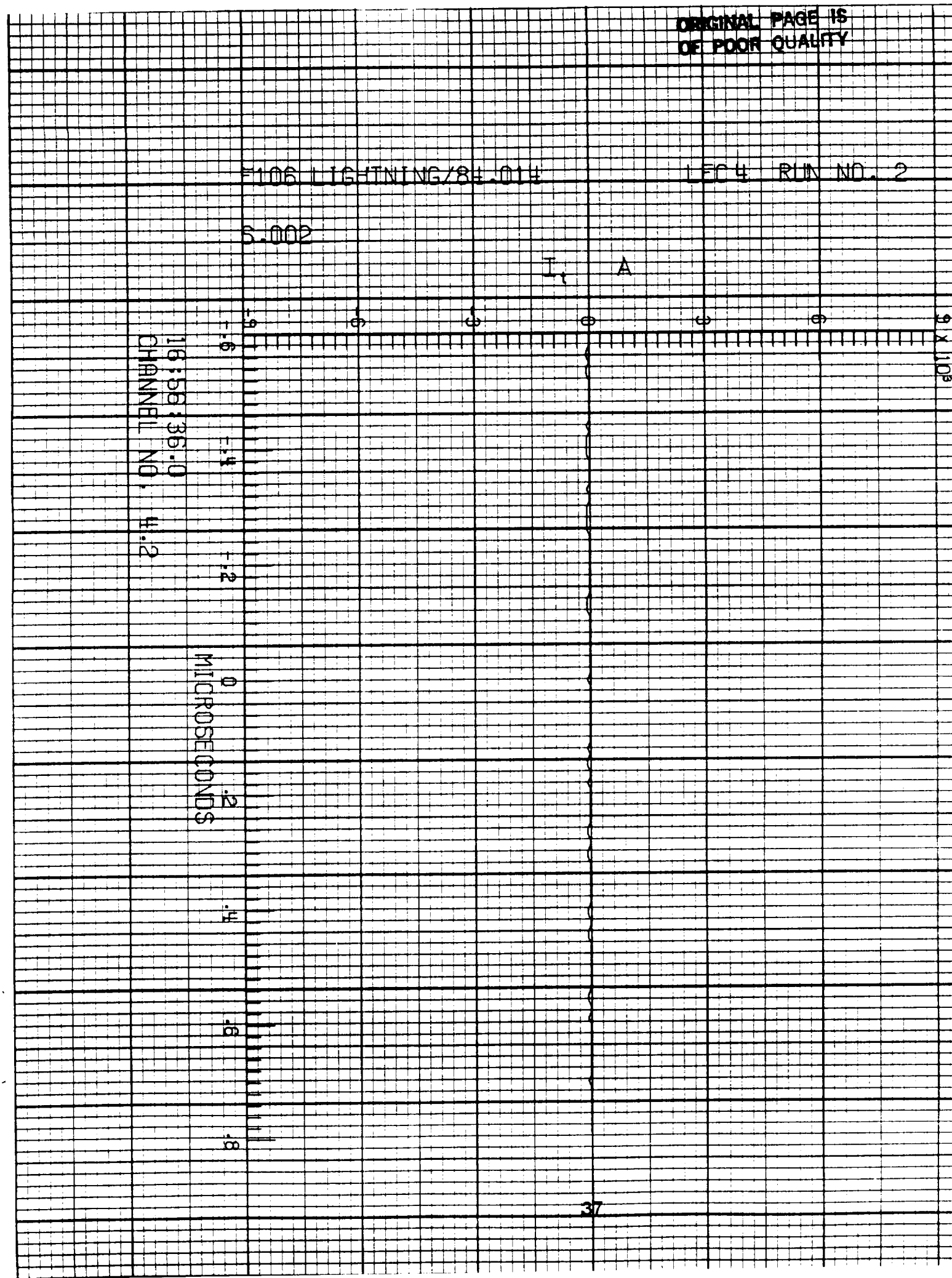

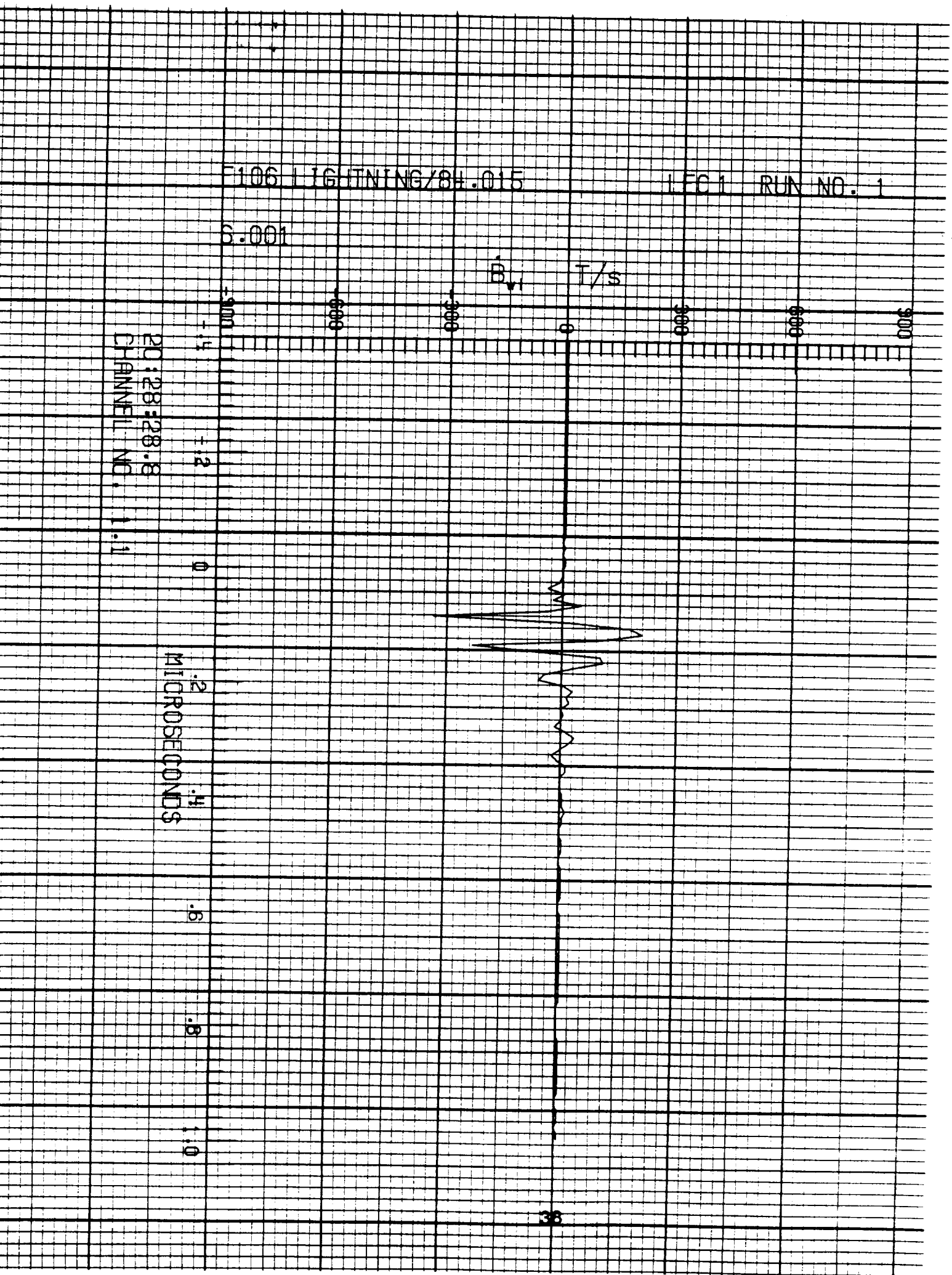
F106 LIGHTNING/84.015
LFC1 RUN NO. 1
S.001
$\dot{B}_{w1}$ T/s
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-300
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300
600
900
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:28:28.8
CHANNEL NO. 1.1

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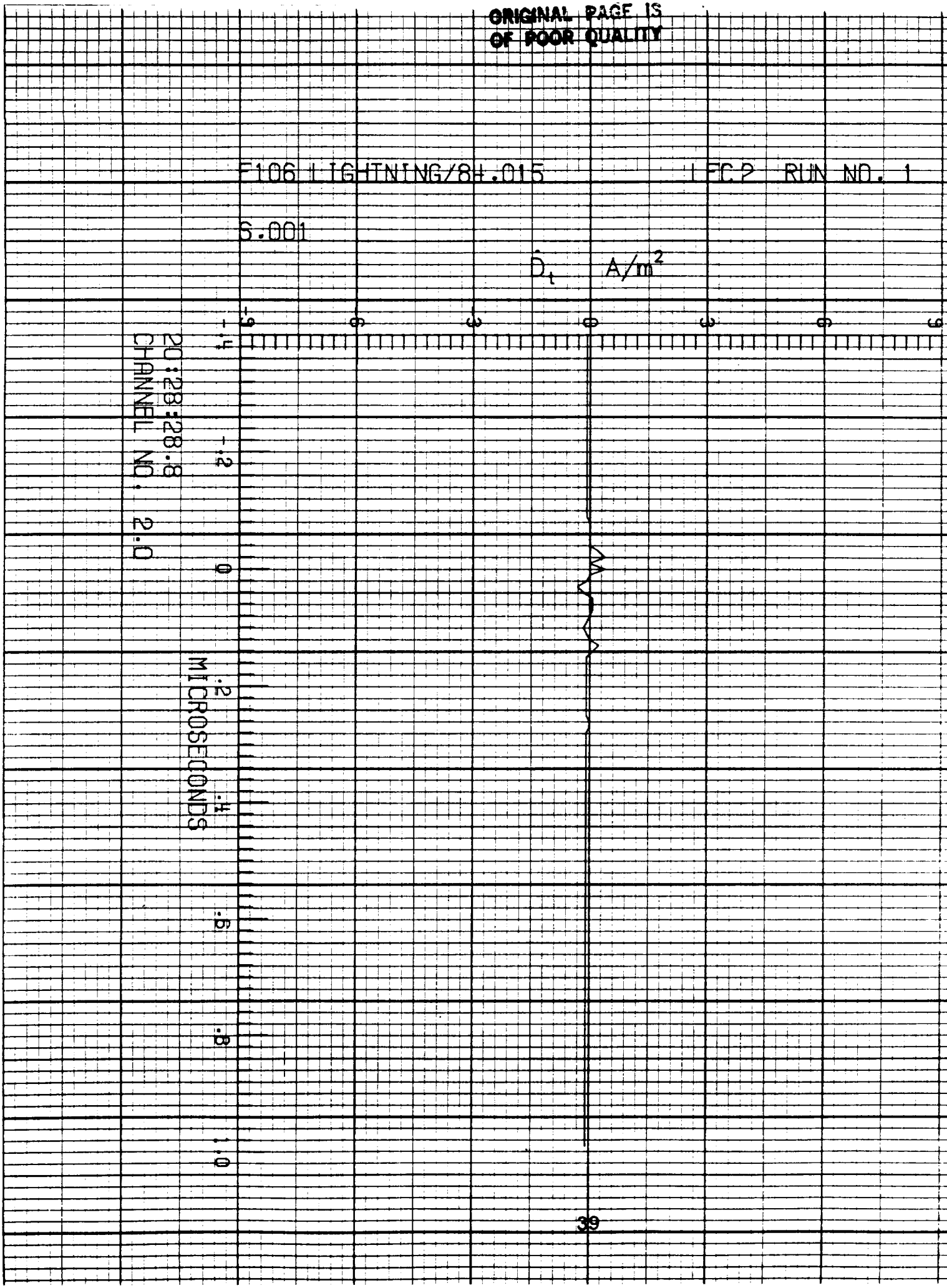

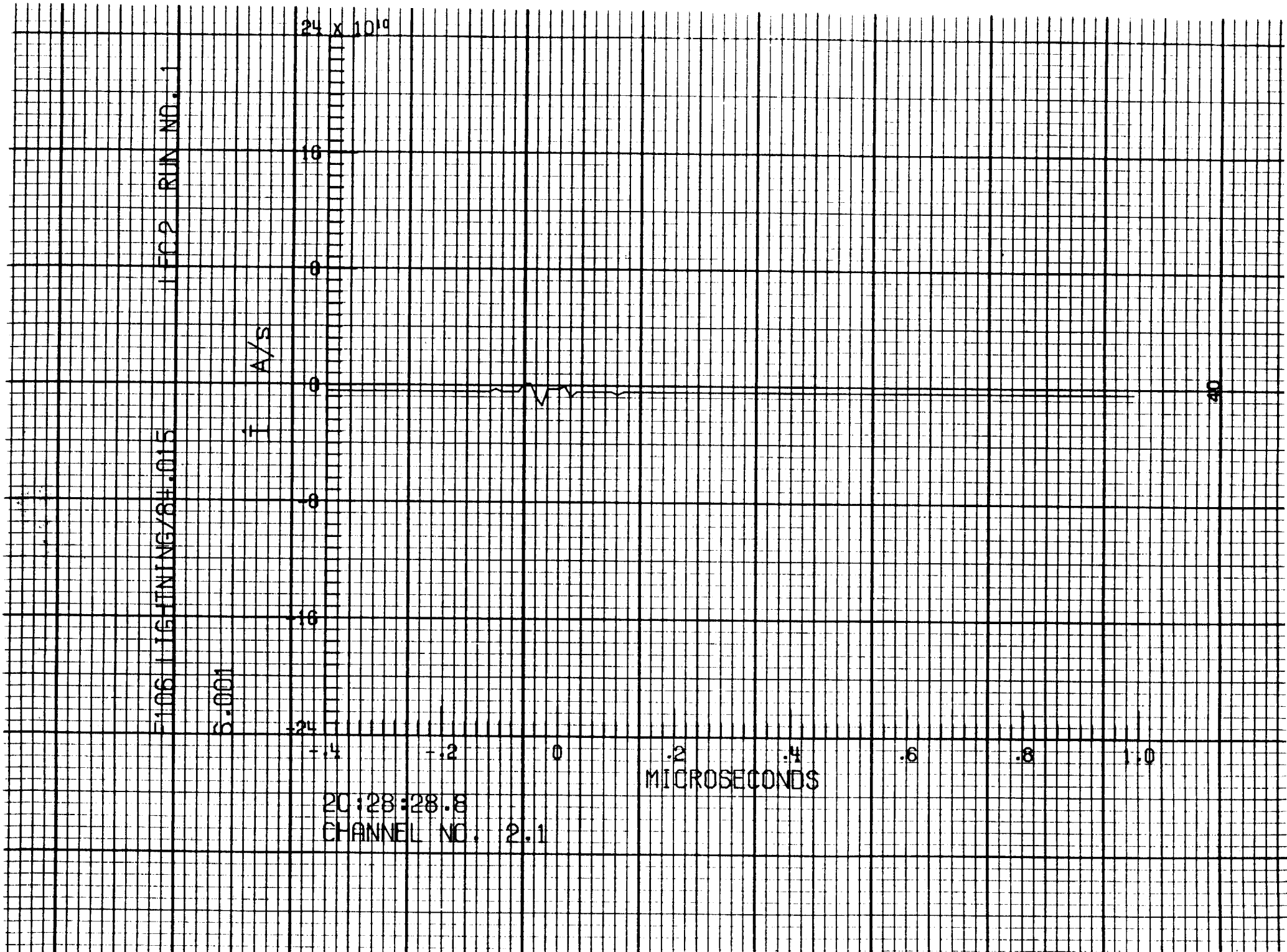
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8
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-8
-16
-24
-.4
-.2
0
.2
.4
.6
.8
1.0
40
MICROSECONDS
A/S
F106 LIGHTNING/8#.015
FC2 RUN NO. 1
6.001
20:28:28.8
CHANNEL NO. 2.1

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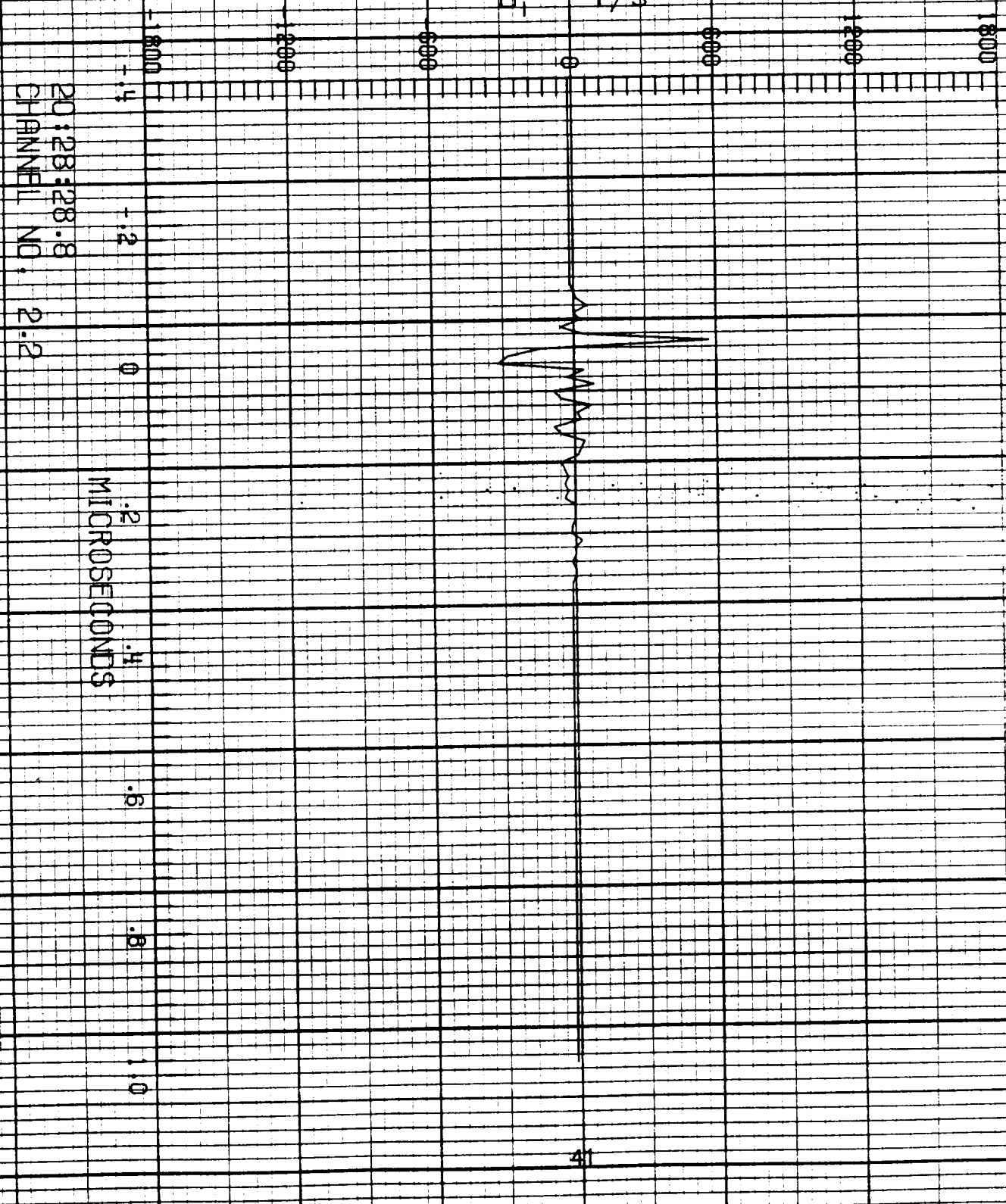
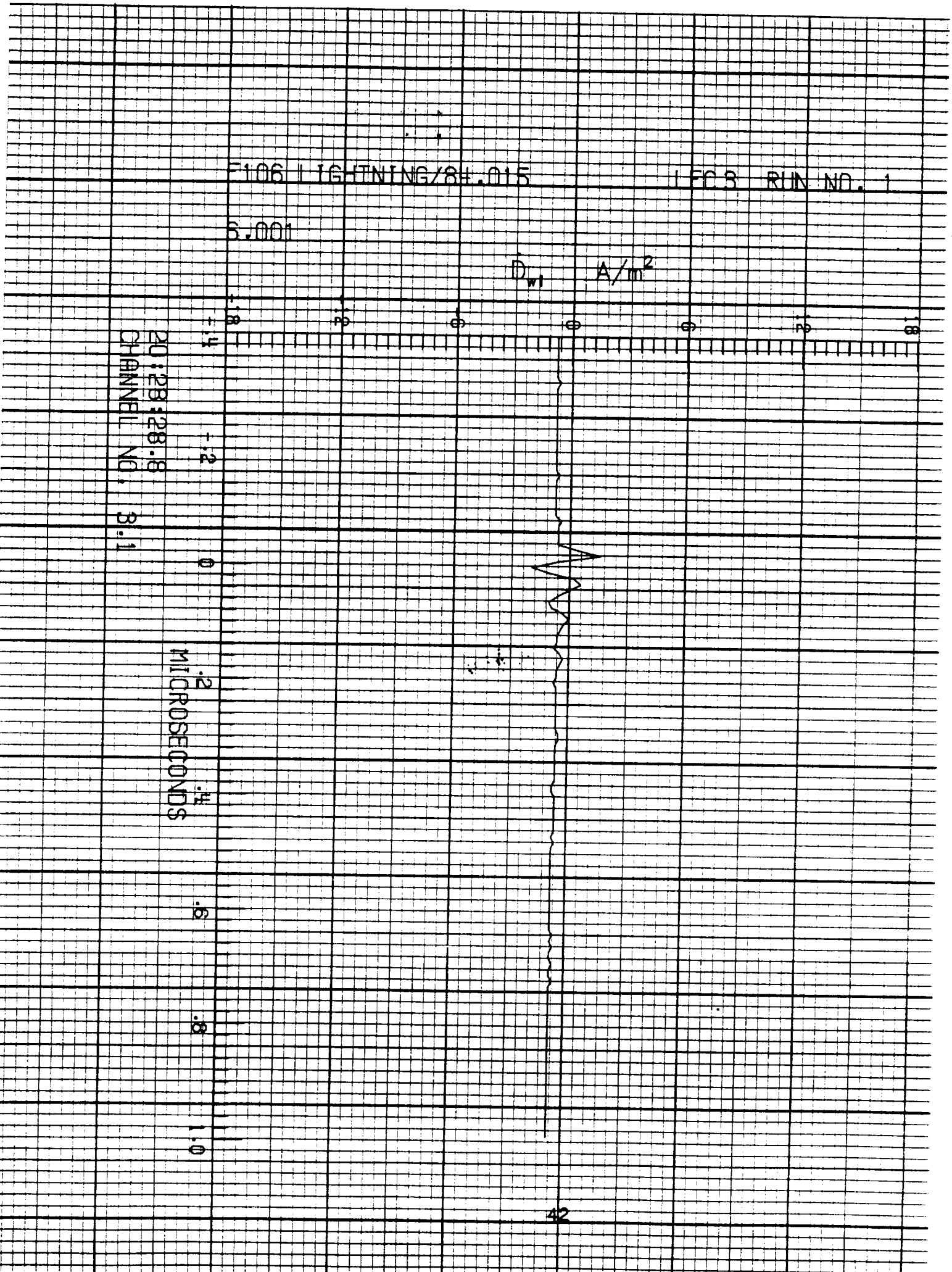
F106 LIGHTNING/84:015 1FC2 RUN NO. 1




F106 LIGHTNING/84.015
LFC3 RUN NO. 1
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D_{w1} A/m^2
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0
.6
.8
-.4
-.2
0
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.4
.6
.8
1.0
MICROSECONDS
20:28:28.8
CHANNEL NO. 3.1

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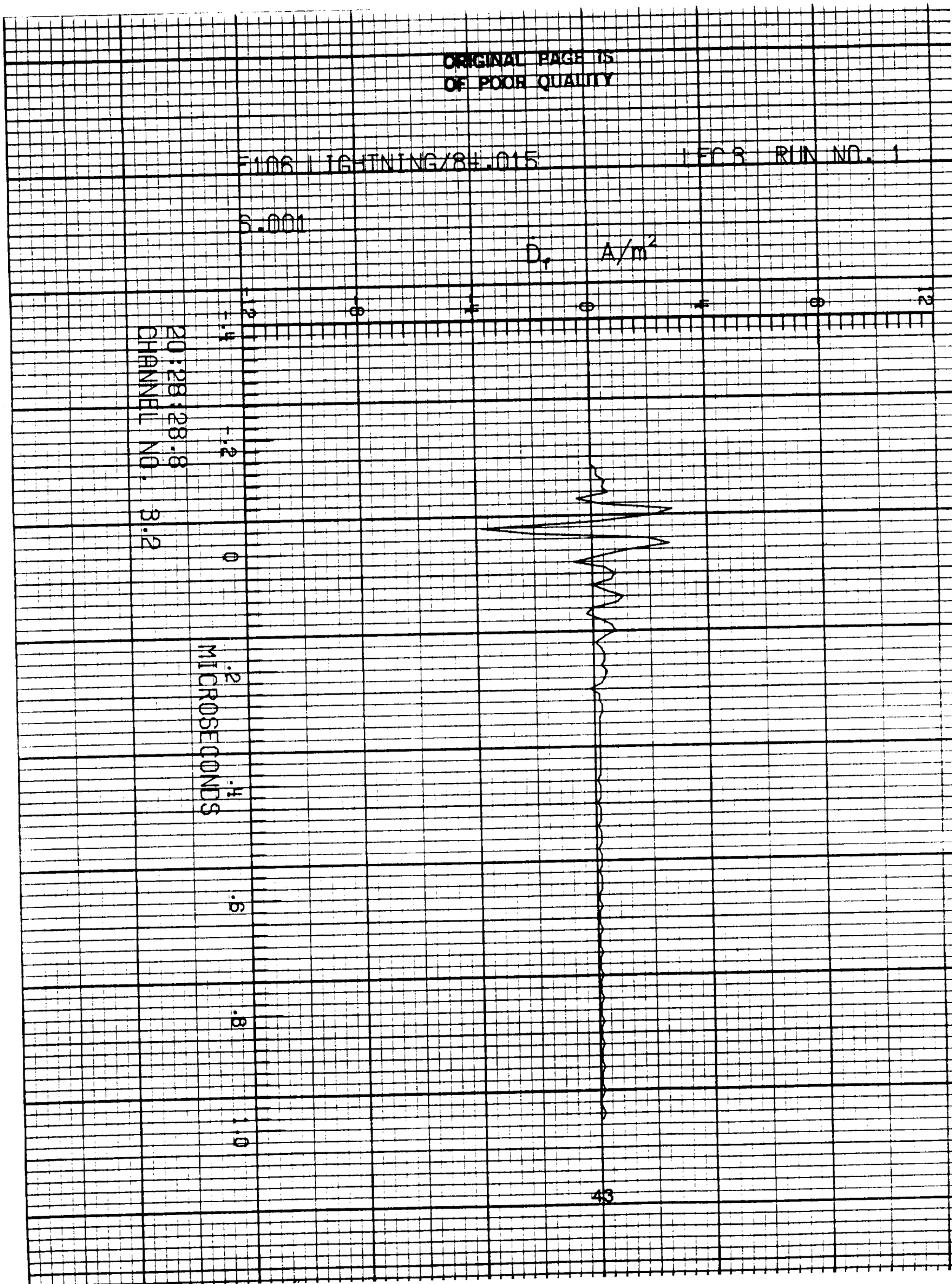

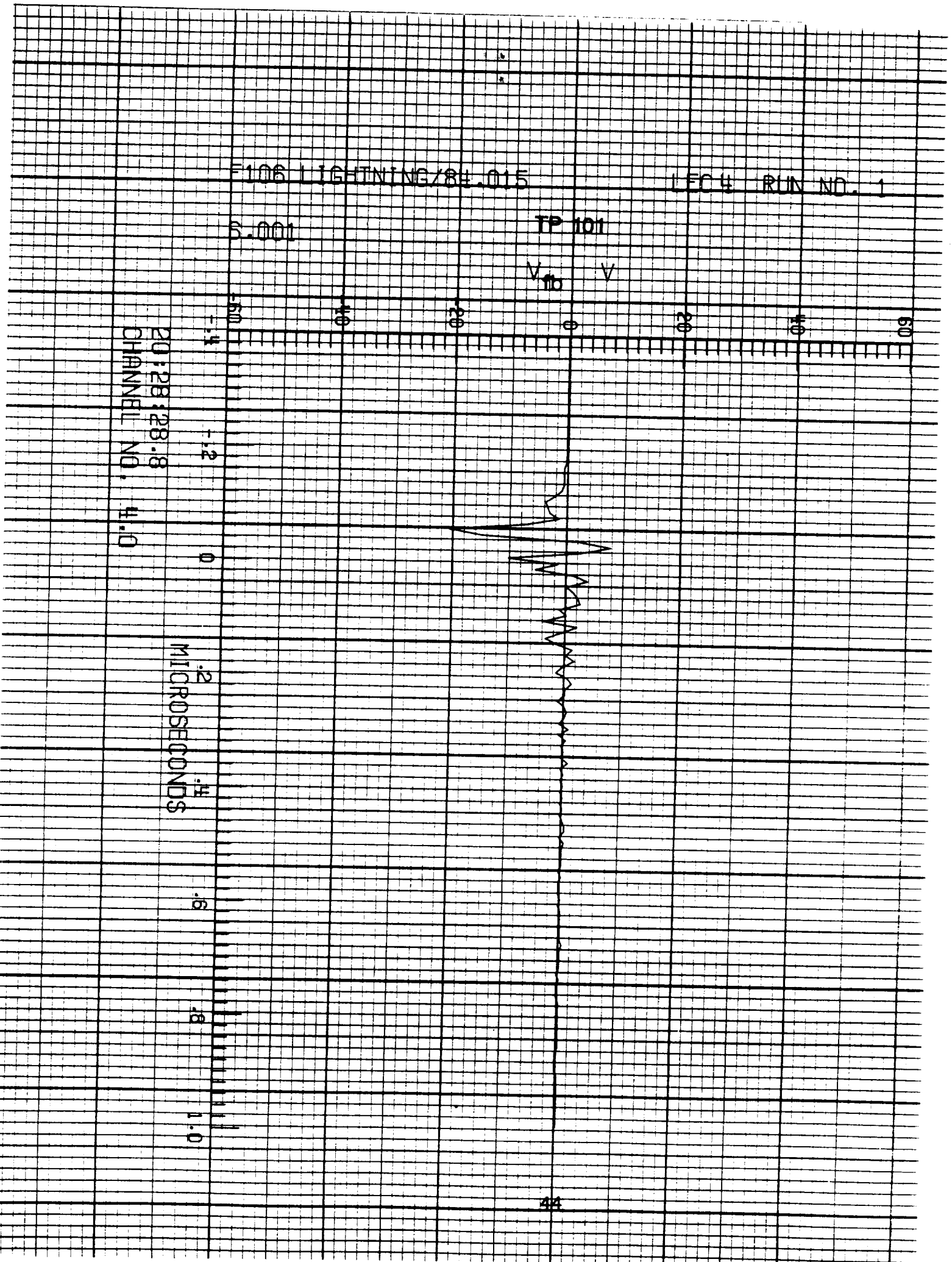
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LEC 4 RUN NO. 1
S.001
TP 101
V
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-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:28:28.8
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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F106 LIGHTNING/8H.015 LFCH RUN NO. 1

6.001

I_n A

-9 -6 -3 0 3 6 9 x 10^8

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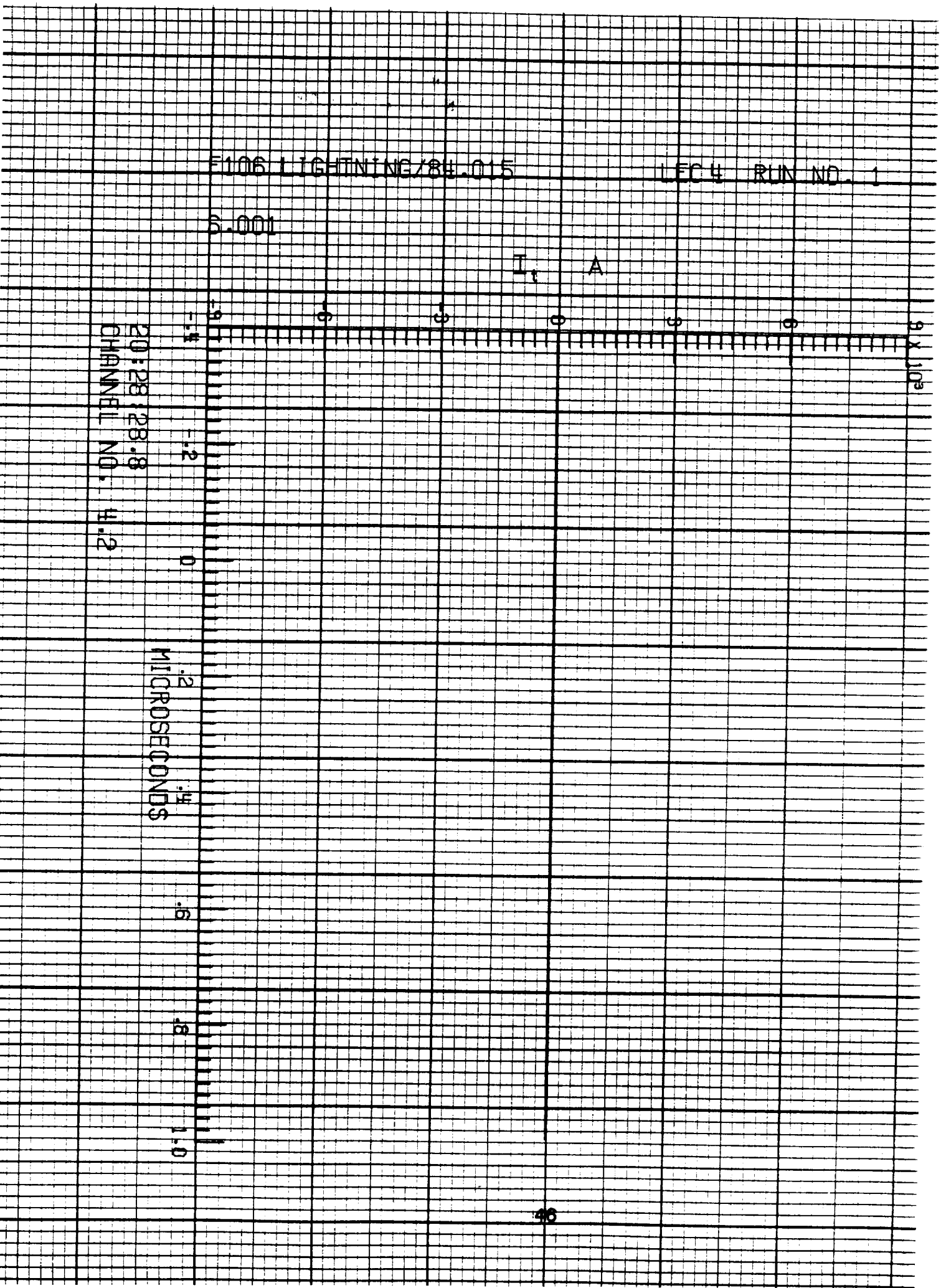
+.2
0
-.2

20:28:28.8
CHANNEL NO. H.1

.2 .4 .6 .8 1.0
MICROSECONDS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LEC 4 RUN NO. 1
S.001
I_t A
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-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
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.8
1.0
MICROSECONDS
20:28:28.8
CHANNEL NO. 4.2

ORIGINAL PAGE IS
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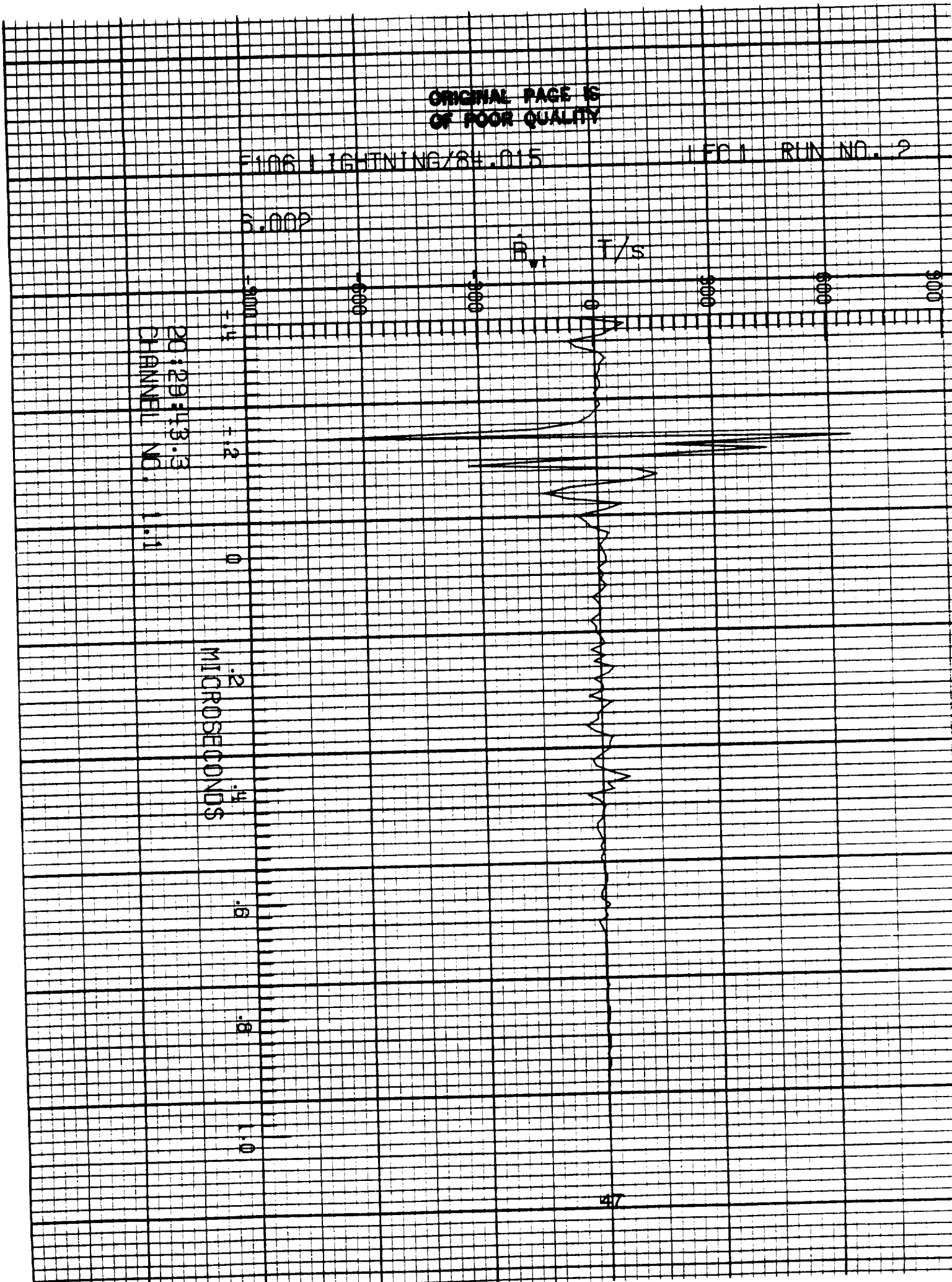

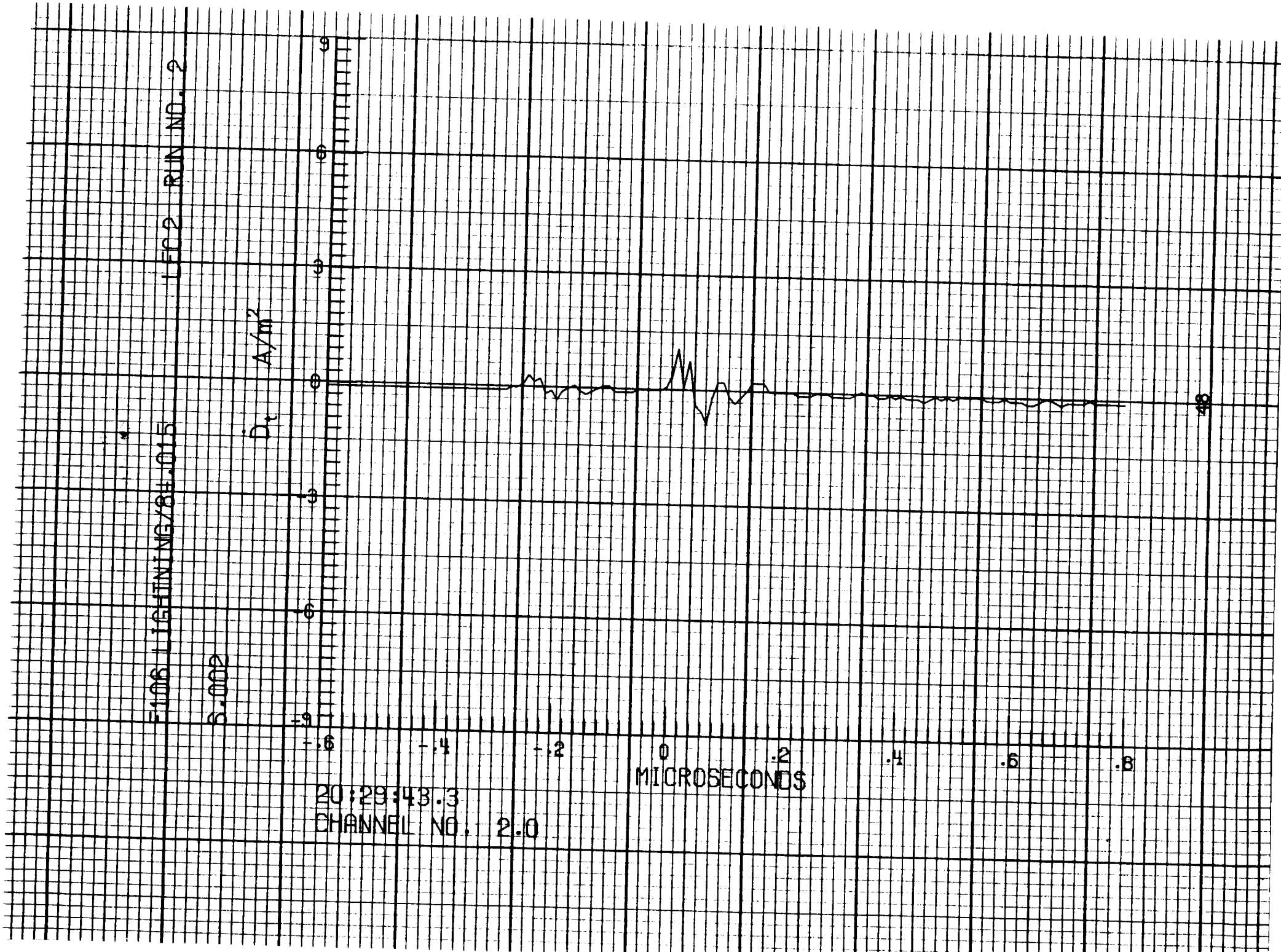
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6.002
UEC2 RUN NO. 2
D_t A/m^2
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6
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0
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-6
-9
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
20:29:43.3
CHANNEL NO. 2.0

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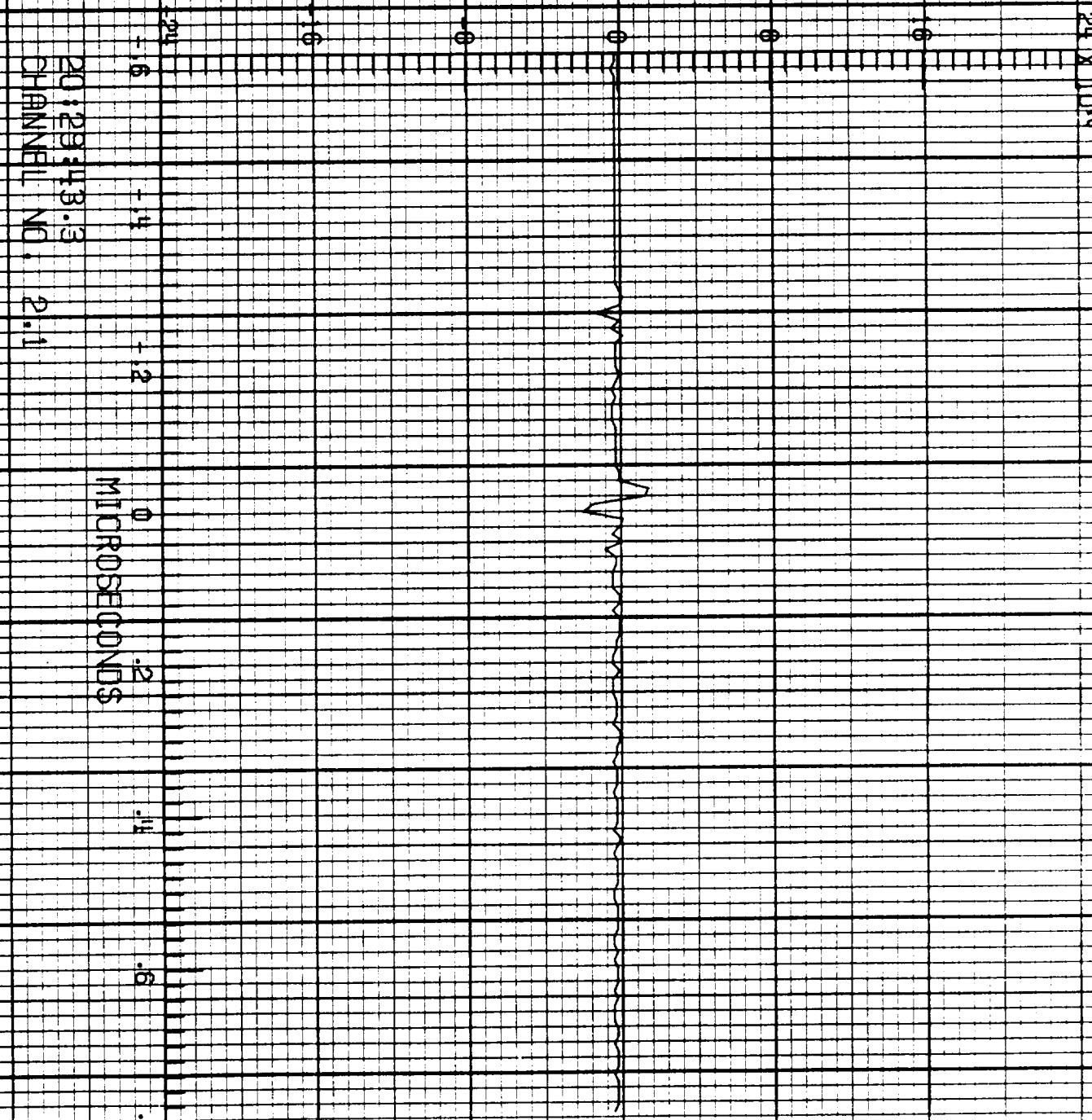
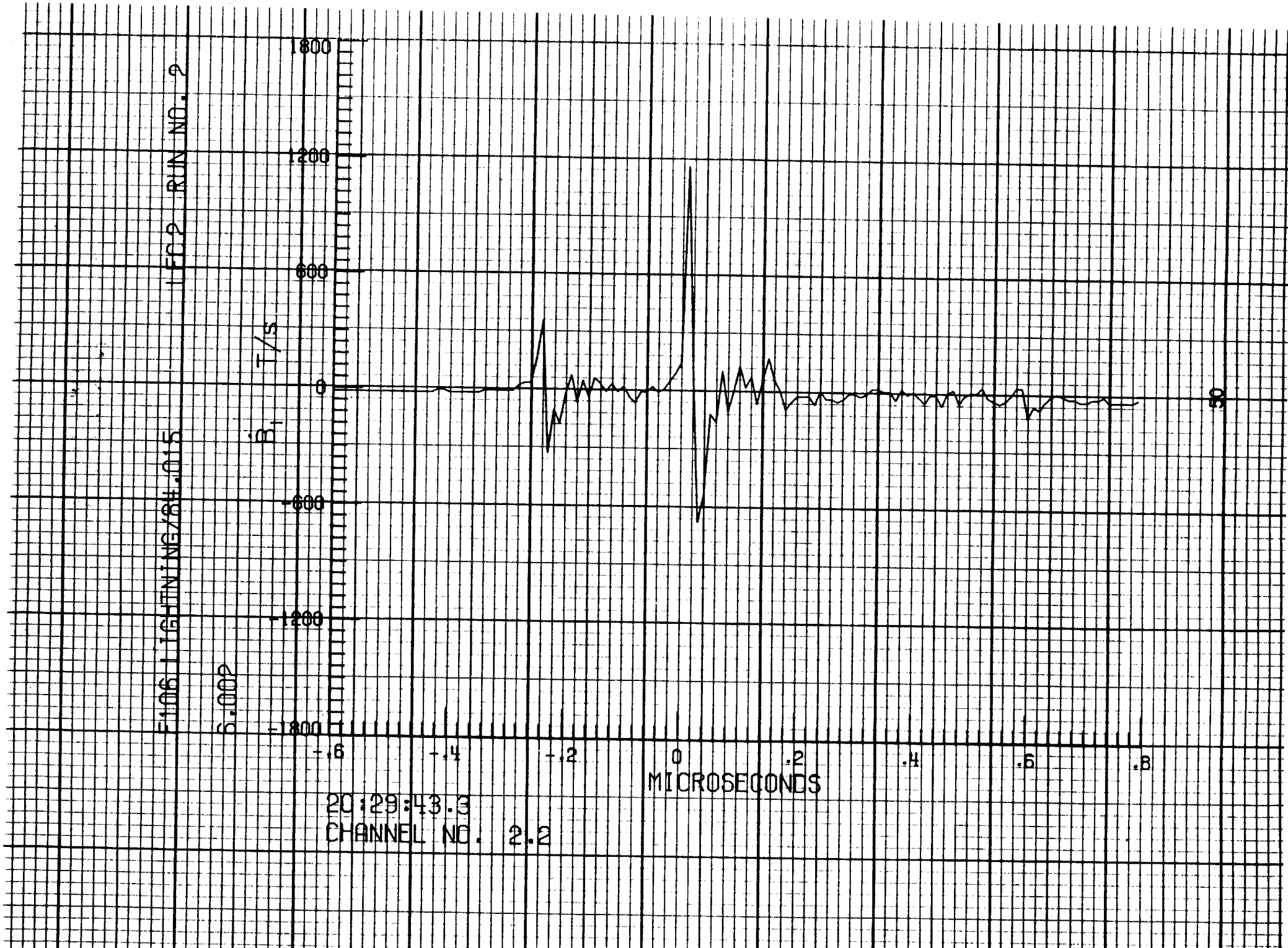
F106 LIGHTNING/84.015 LEC2 RUN NO. 2

6.002

$\dot{I}$ A/s

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1200
600
0
-600
-1200
-1800
T/S
+.6
+.4
+.2
0
.2
.4
.6
.8
MICROSECONDS
20:29:43.3
CHANNEL NO. 2.2

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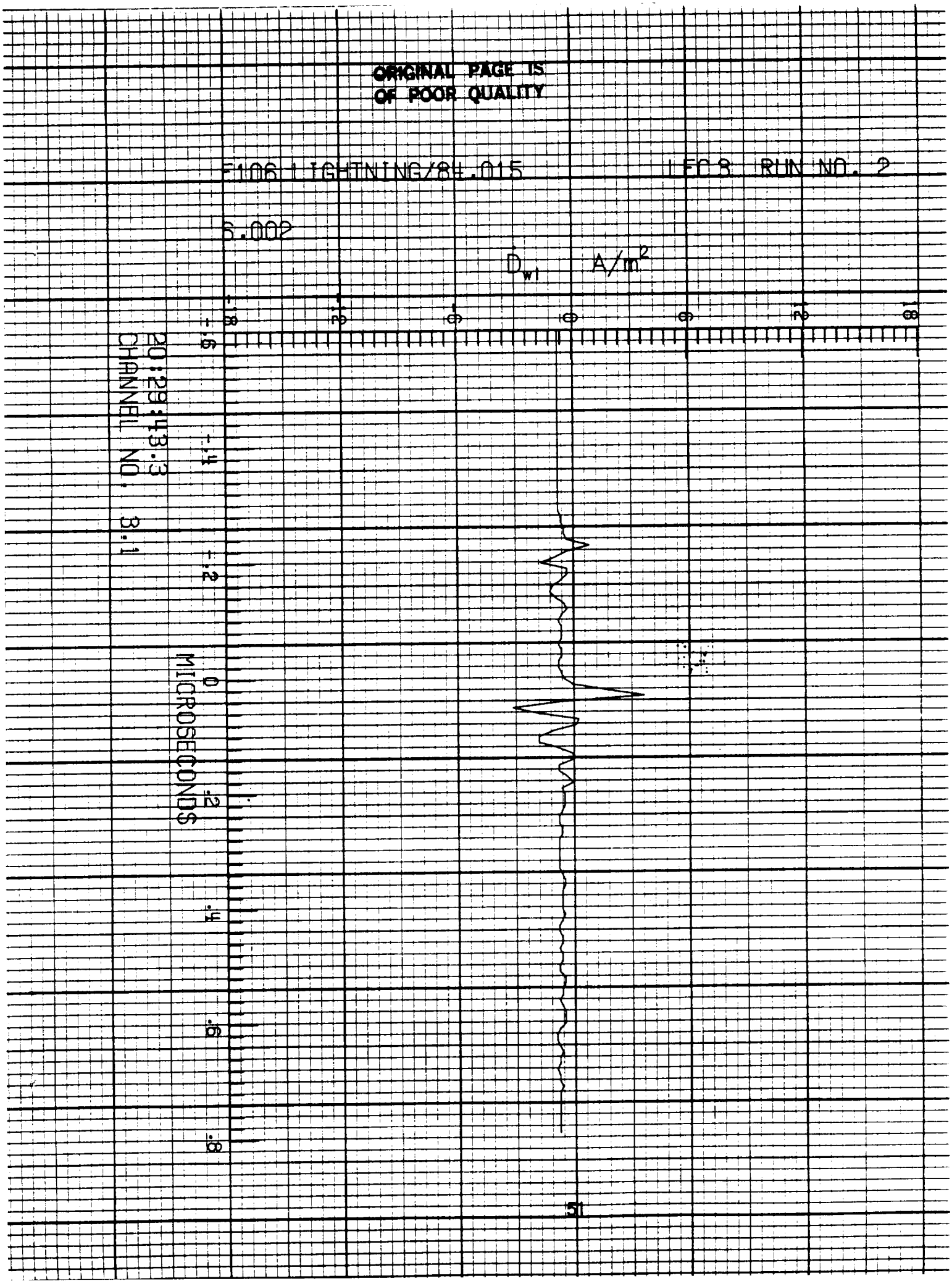
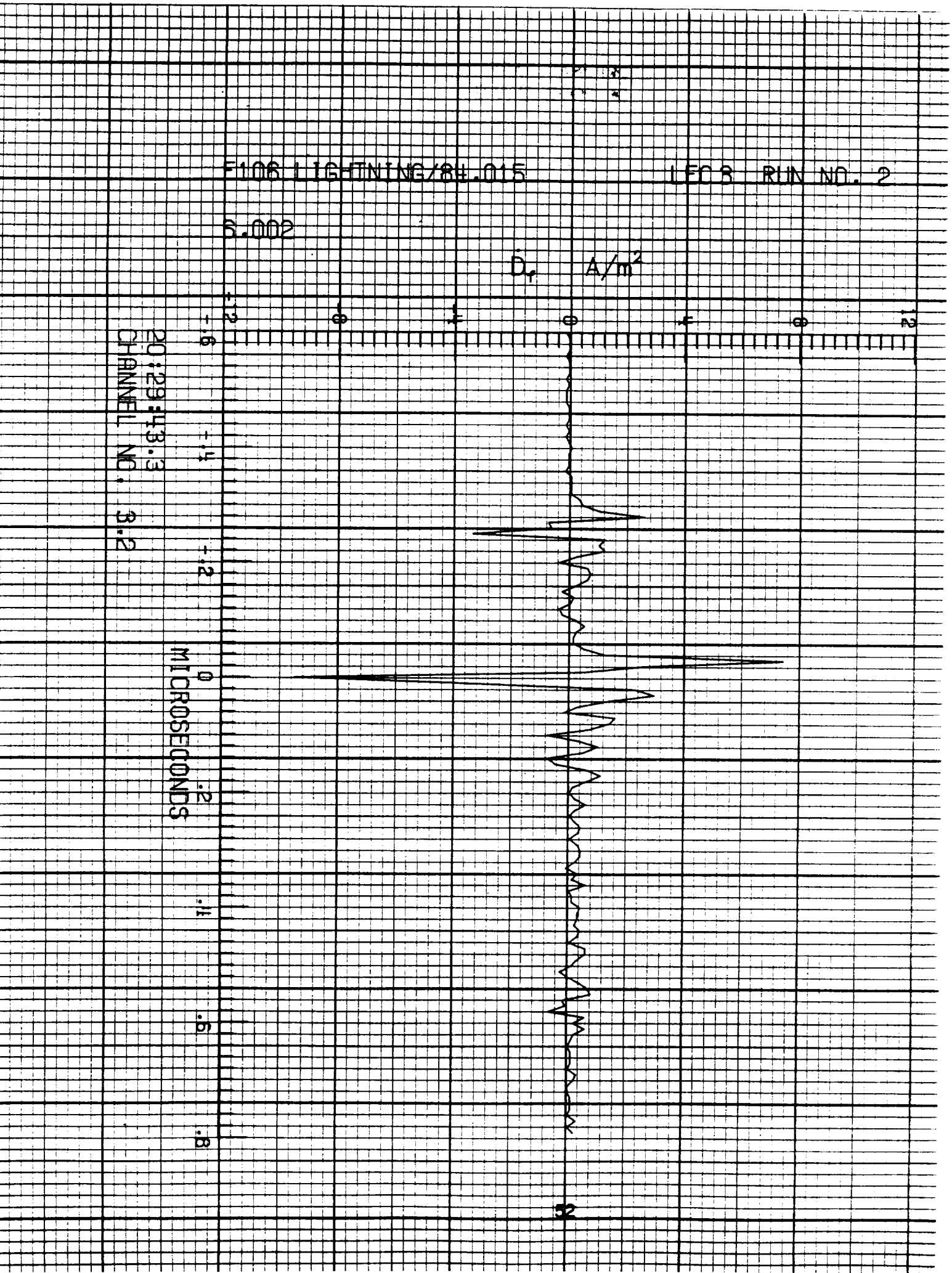
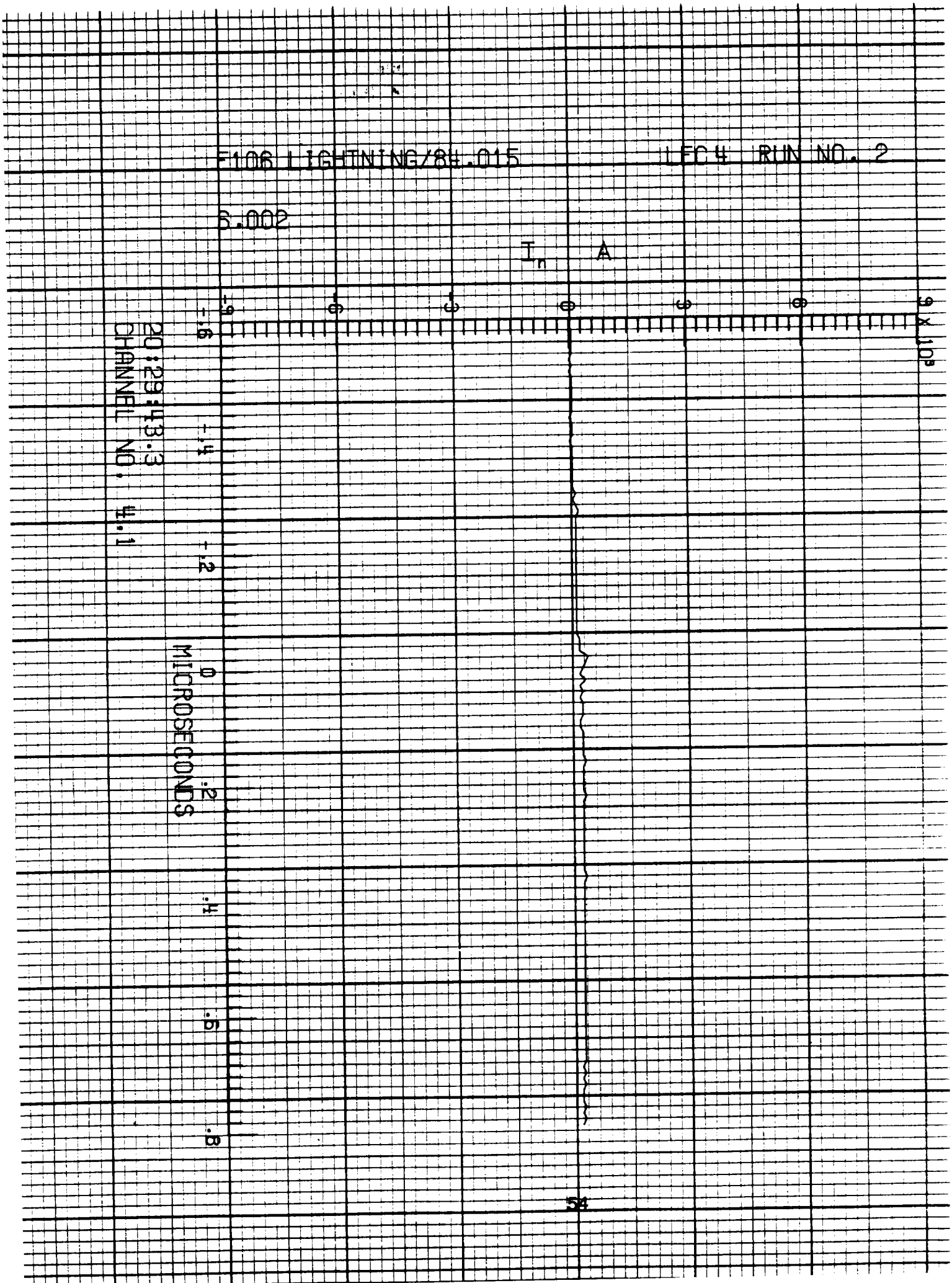
OF POOR QUALITY




F106 LIGHTNING/84.015
LEC 8 RUN NO. 2
6.002
D_f A/m^2
-12
-8
-4
0
4
8
12
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
20:29:43.3
CHANNEL NO. 3.2


F106 LIGHTNING/84.015
LEC 4 RUN NO. 2
6.002
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
20:29:43.3
CHANNEL NO. 4.1

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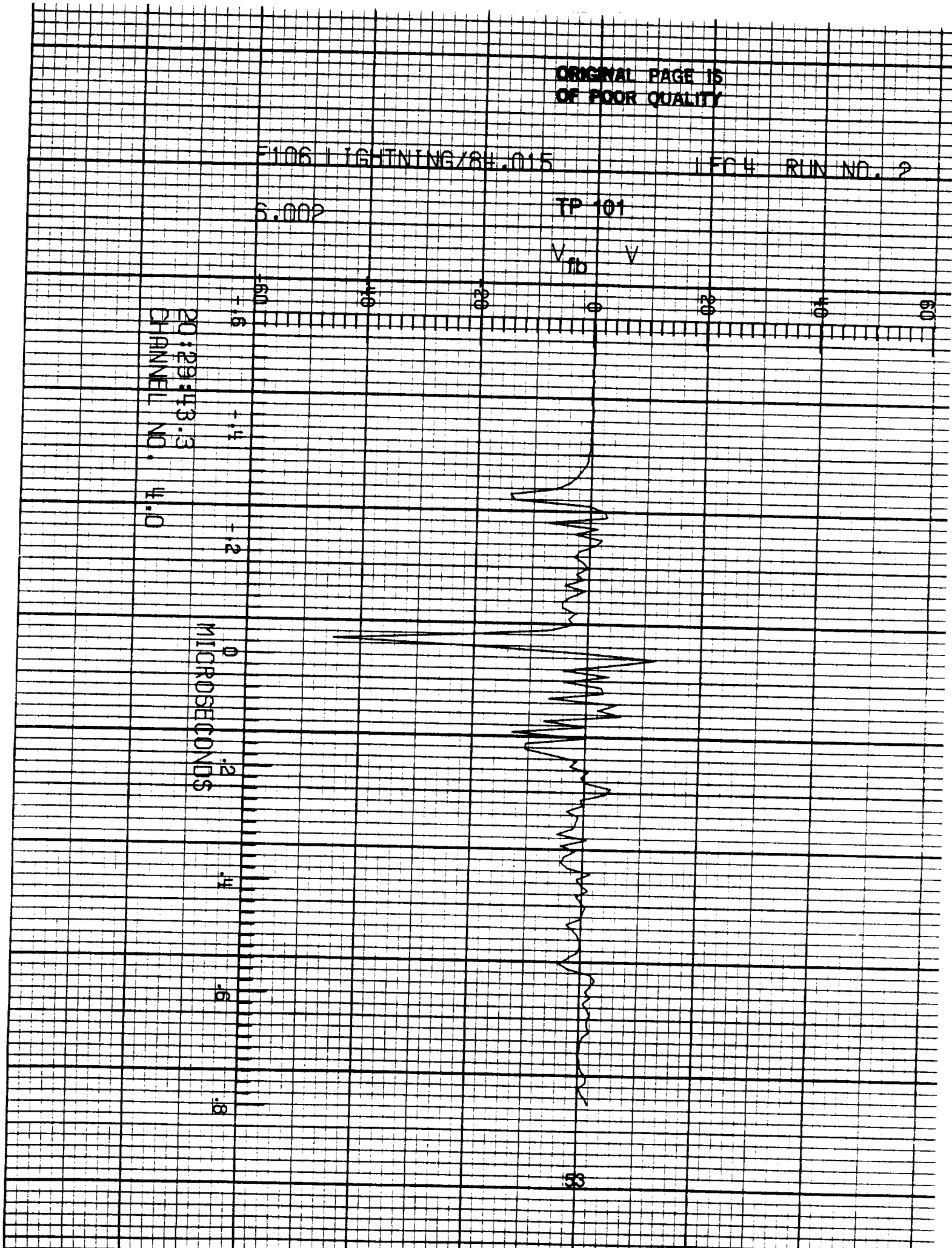
OF POOR QUALITY



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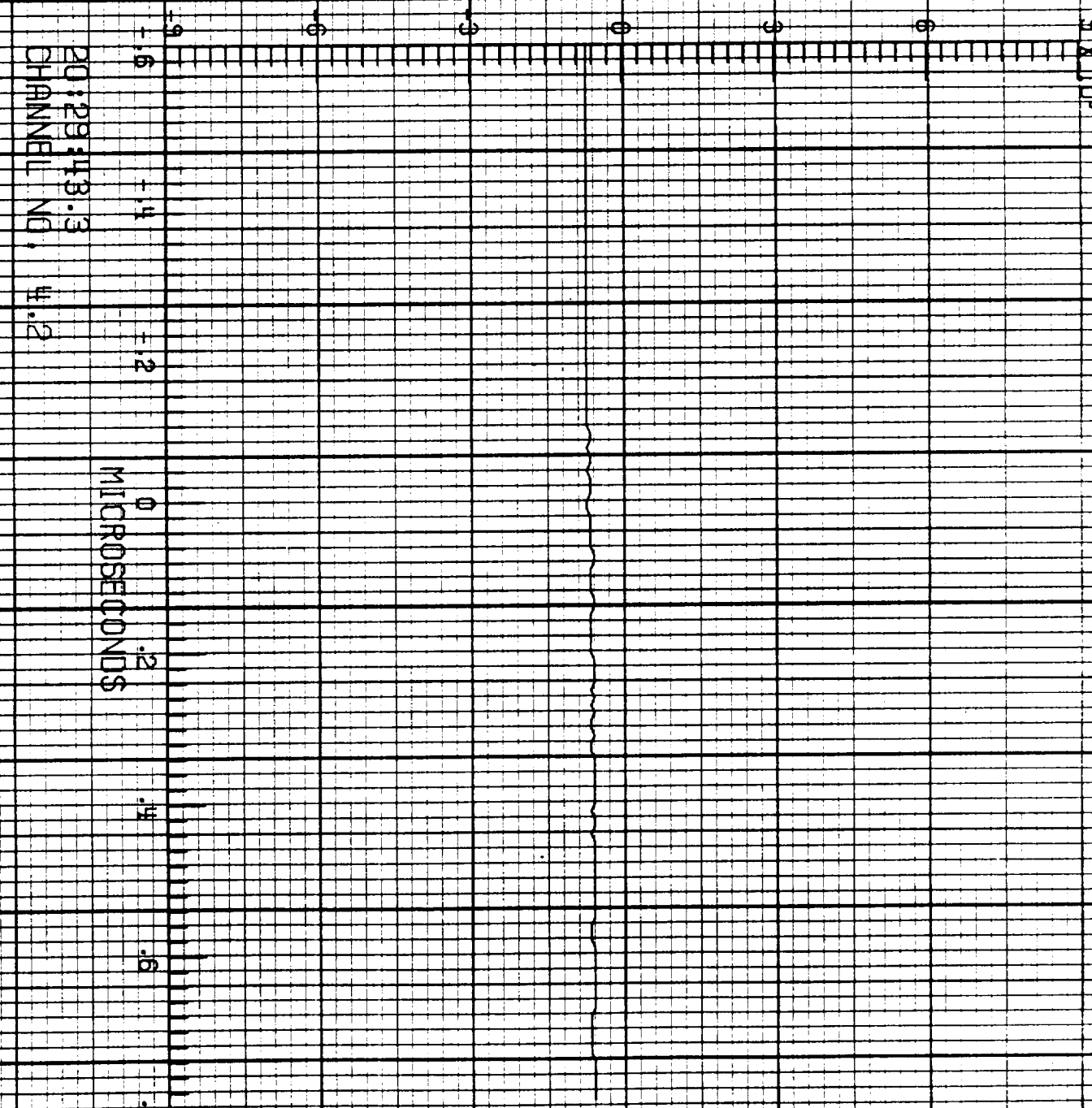
F106 LIGHTNING/8H.015 LEC4 RUN NO. 2

6.002

I_t A



F106 LIGHTNING/84.015 LFC 1 RUN NO. 3

N.001

$\dot{B}_{wi}$ T/s

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:39:15.3

CHANNEL NO.: 1-1

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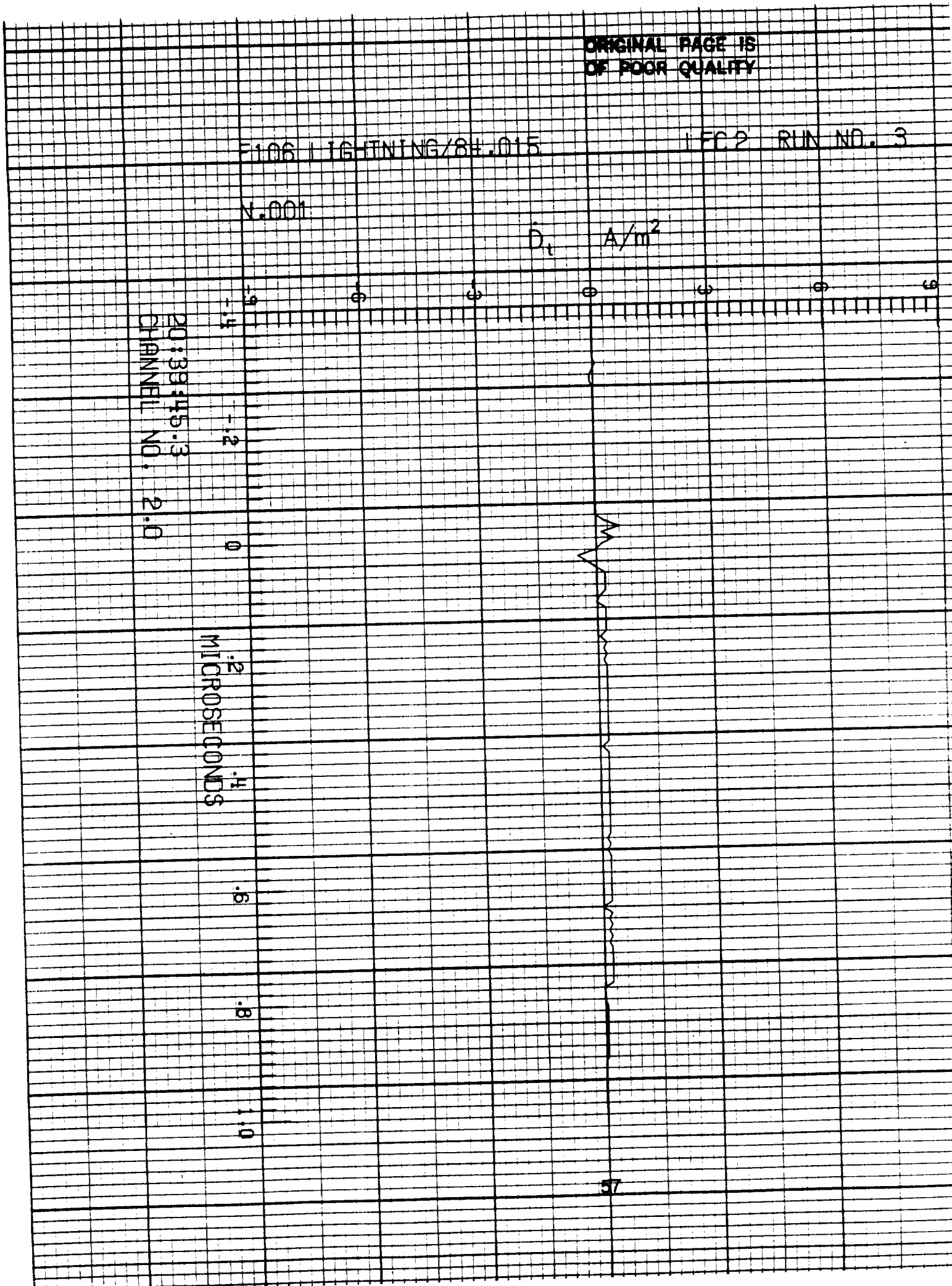

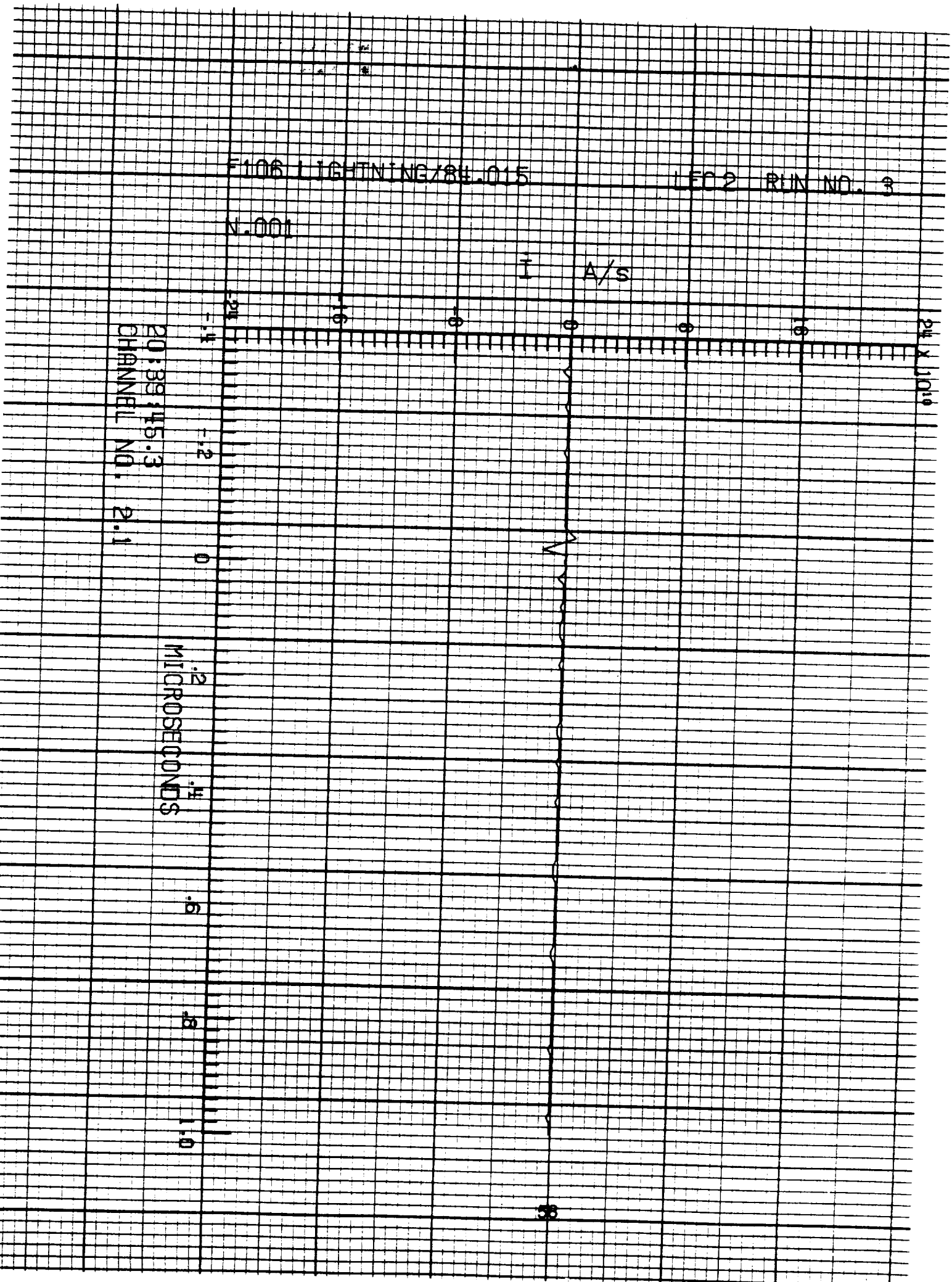
F106 LIGHTNING/84.015
LEC2 RUN NO. 3
N.001
I A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:39:45.3
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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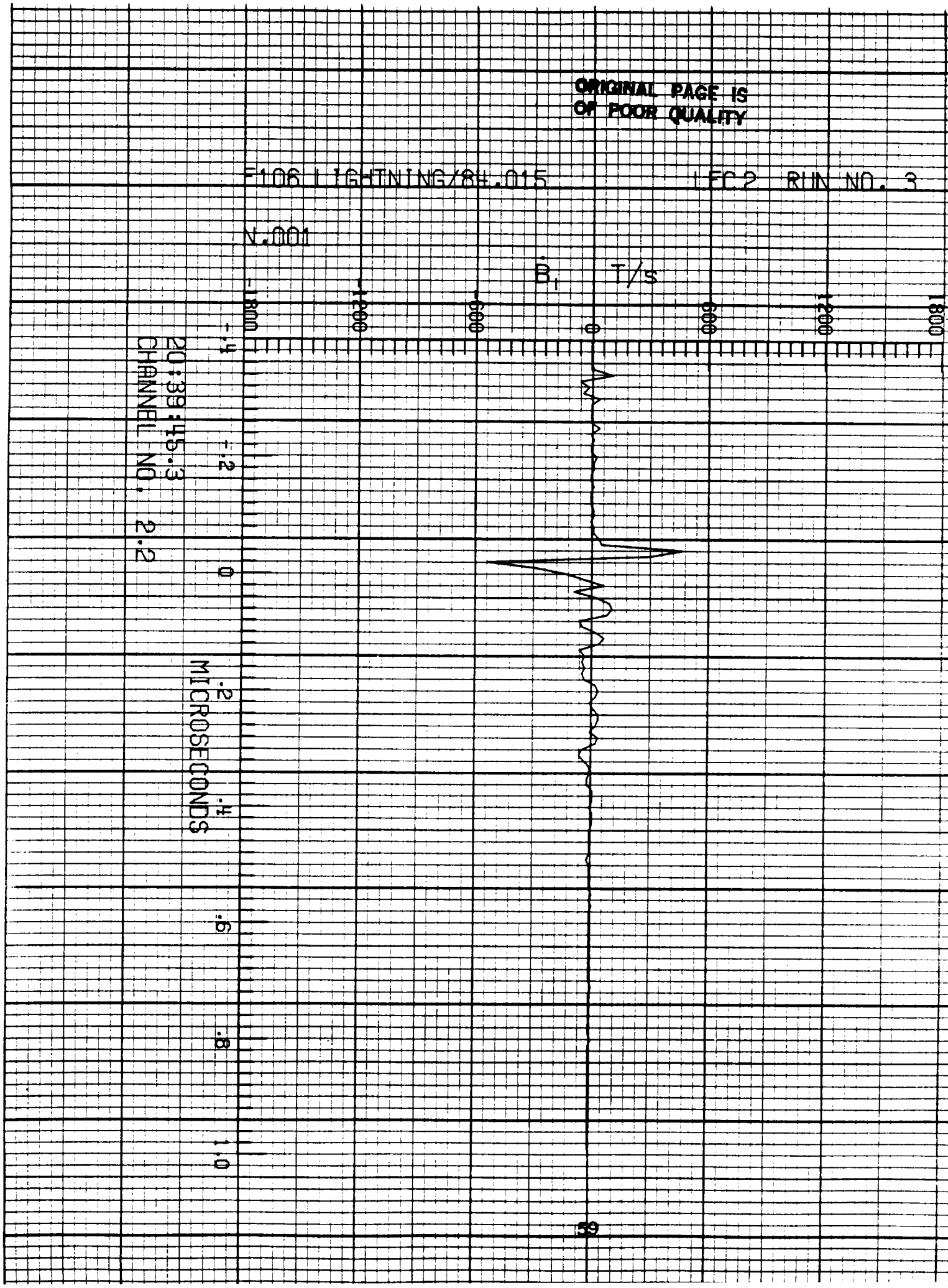

F106 LIGHTNING/84.015 IFCB RUN NO. 3

N.001

$\dot{D}_{w1}$ A/m^2

-1.0 -.5 0 .5 1.0

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:39:45.3

CHANNEL NO: 8.1

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COLOR PHOTOGRAPH

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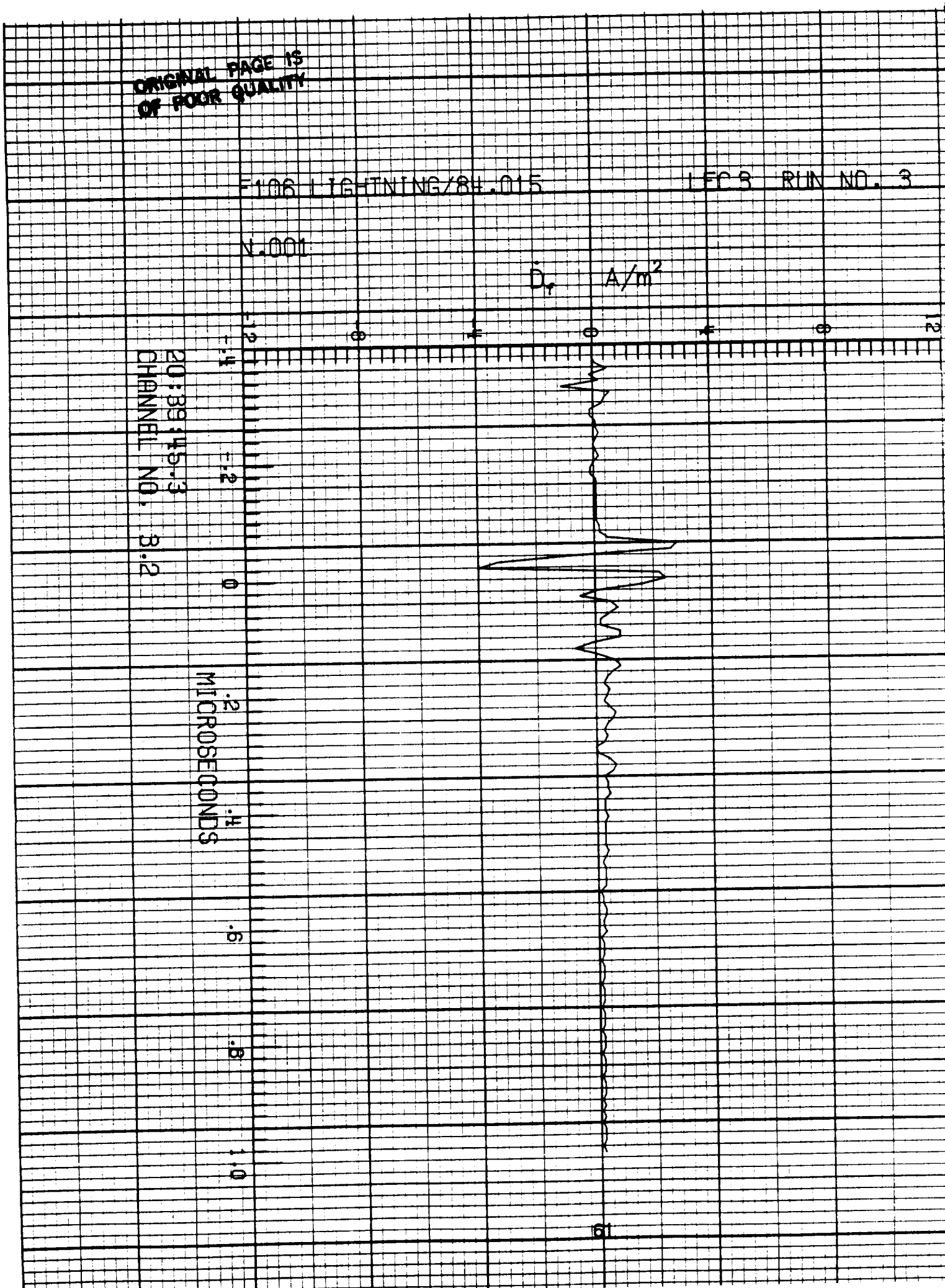


F106 LIGHTNING/84.015 LEC4 RUN NO. 3

N.001 TP 101

V_{fb} V

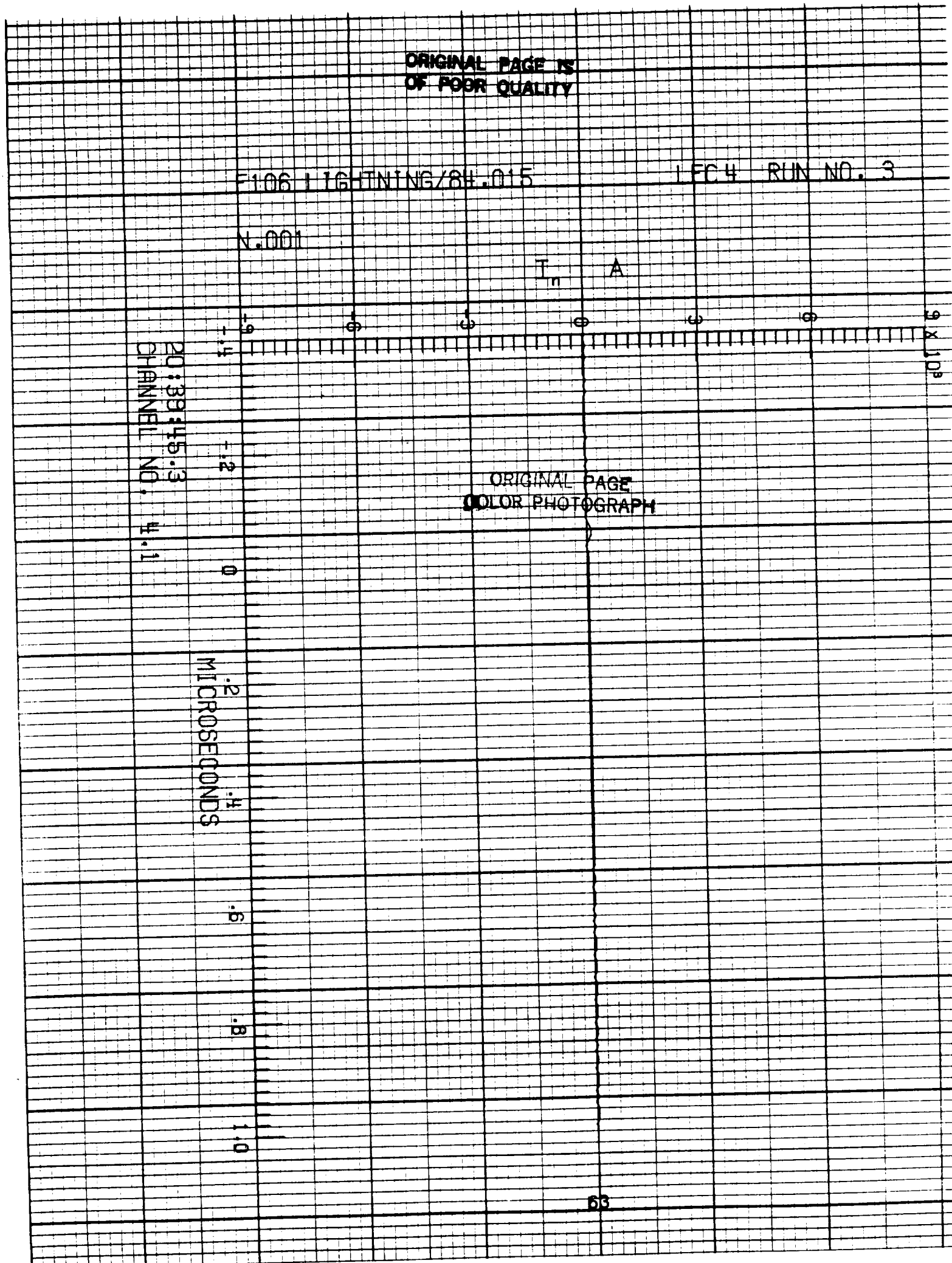
-60 -40 -20 0 20 40 60

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:38:45.3 CHANNEL NO. 1 ON

ORIGINAL PAGE IS
OF POOR QUALITY



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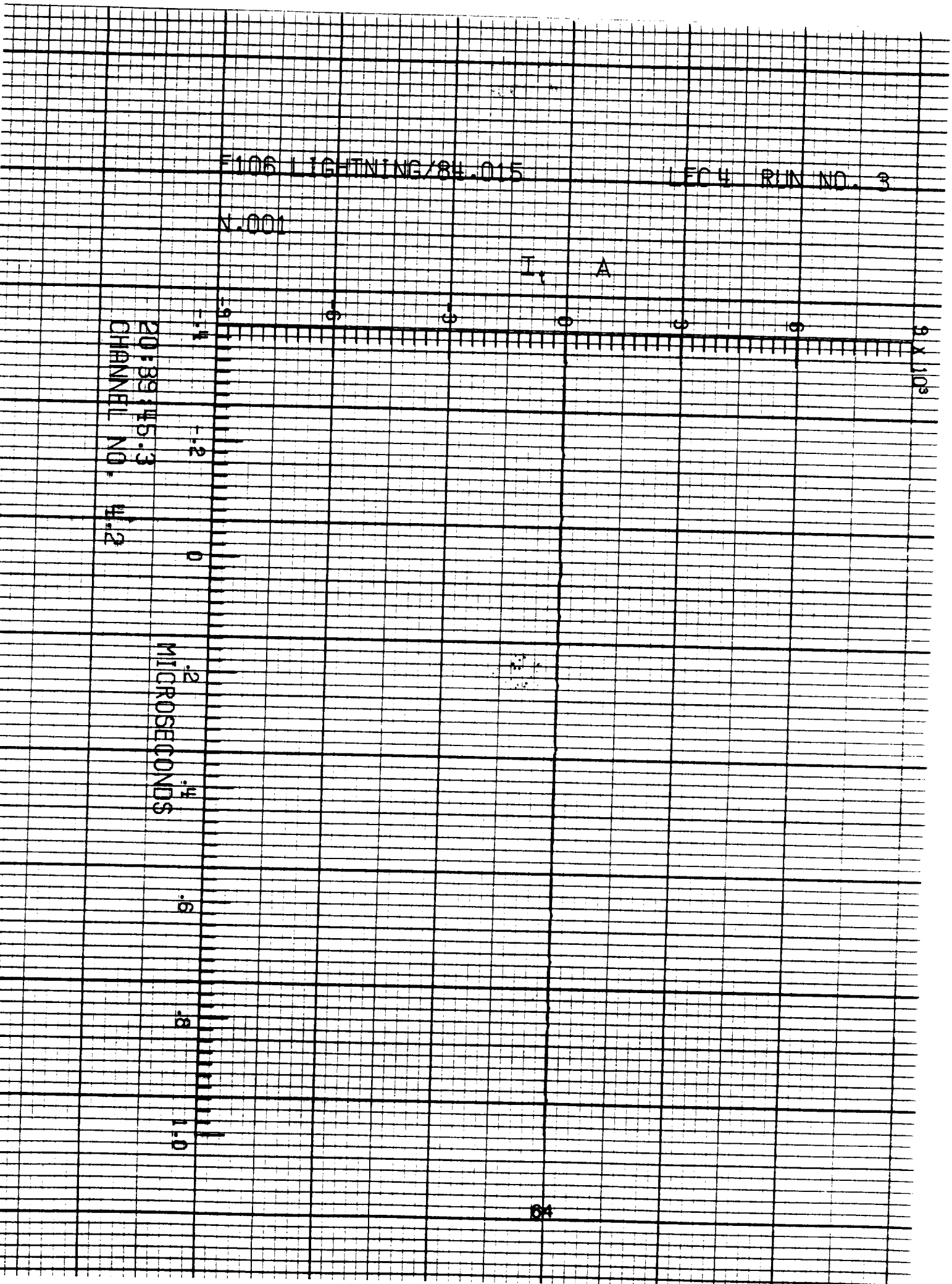
F106 LIGHTNING/84.015
LEC 4 RUN NO. 3
N.001
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:39:45.3
CHANNEL NO. 4.2

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OF POOR QUALITY

F106 LIGHTNING/84.015 LEC 1 RUN NO. 4

N.002

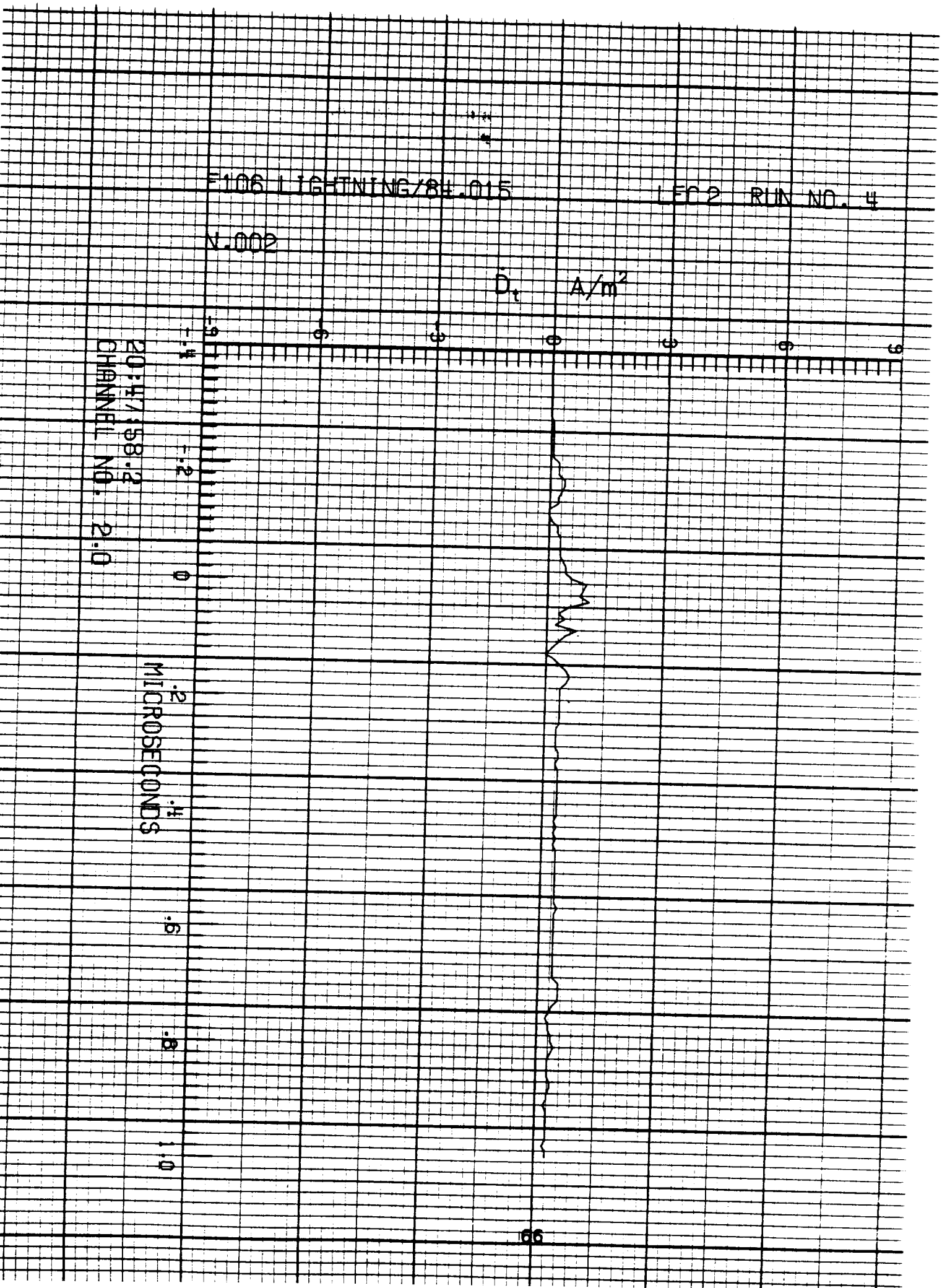
$\dot{B}_{W1}$ T/S

-800 -600 -400 -200 0 200 400 600 800

+.4
+.2
0
-.2
-.4
-.6
-.8
-1.0

MICROSECONDS

20:47:58.2
CHANNEL NO. 1.1


F106 LIGHTNING/84.015
LEC 2 RUN NO. 4
N.002
$\dot{D}_t$ A/m^2
-9
-6
-3
0
3
6
9
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:47:58.2
CHANNEL NO. 2.0

ORIGINAL PAGE IS
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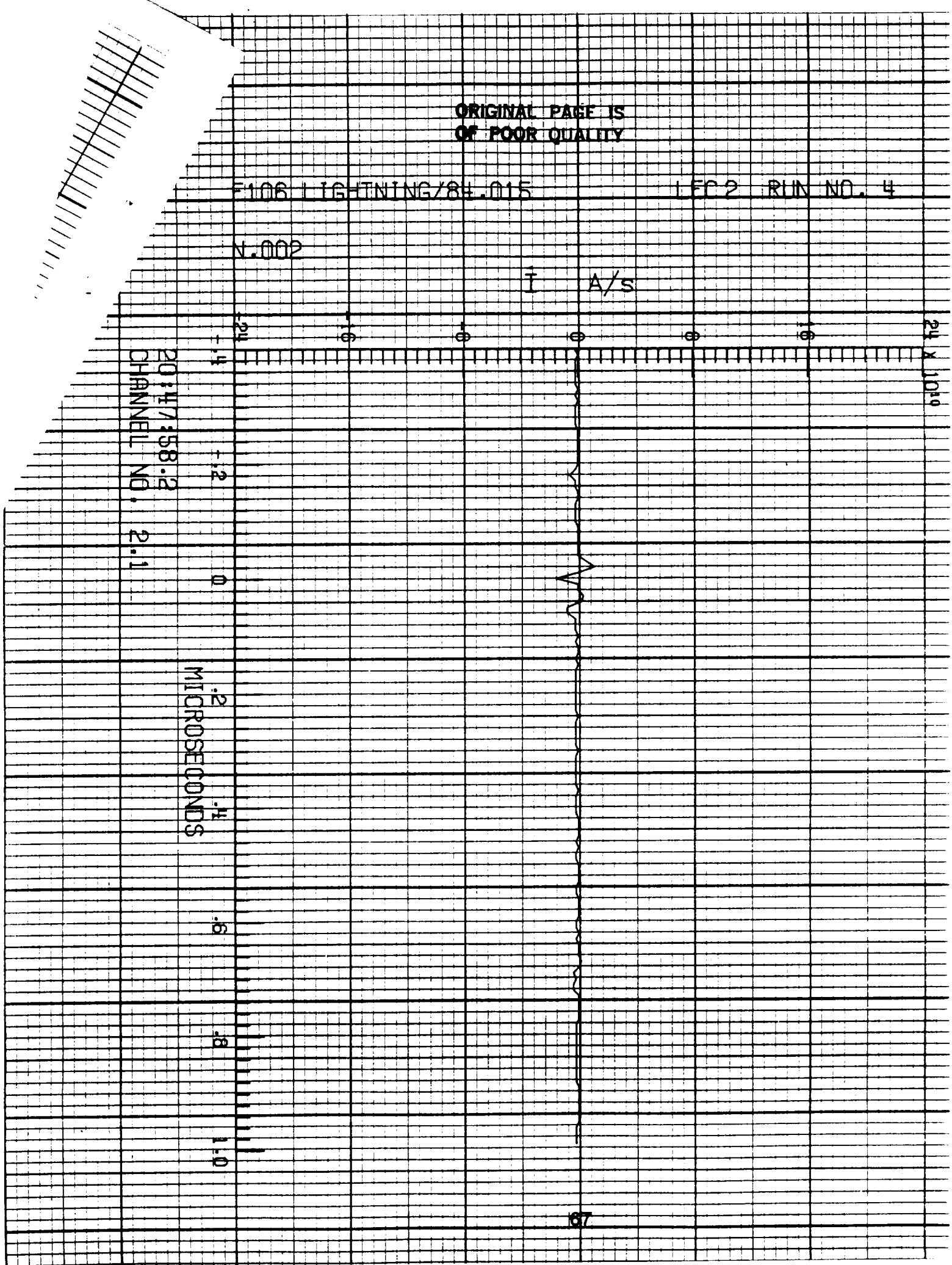

F106 LIGHTNING/84.015 IFC2 RUN NO. 4

N.002

$\dot{B}_t$ T/s

-1800 -1200 -600 0 600 1200 1800

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

20:47:58.2

CHANNEL NO. 2.2

F106 LIGHTNING/81.015 IFC 3 RUN NO. 4

N.002

$\dot{D}_f$ A/m^2

1.2 1.0 .8 .6 .4 .2 0 .2 .4 .6 .8 1.0 1.2

MICROSECONDS

CHANNEL NO. 3.2

20:47:58.2

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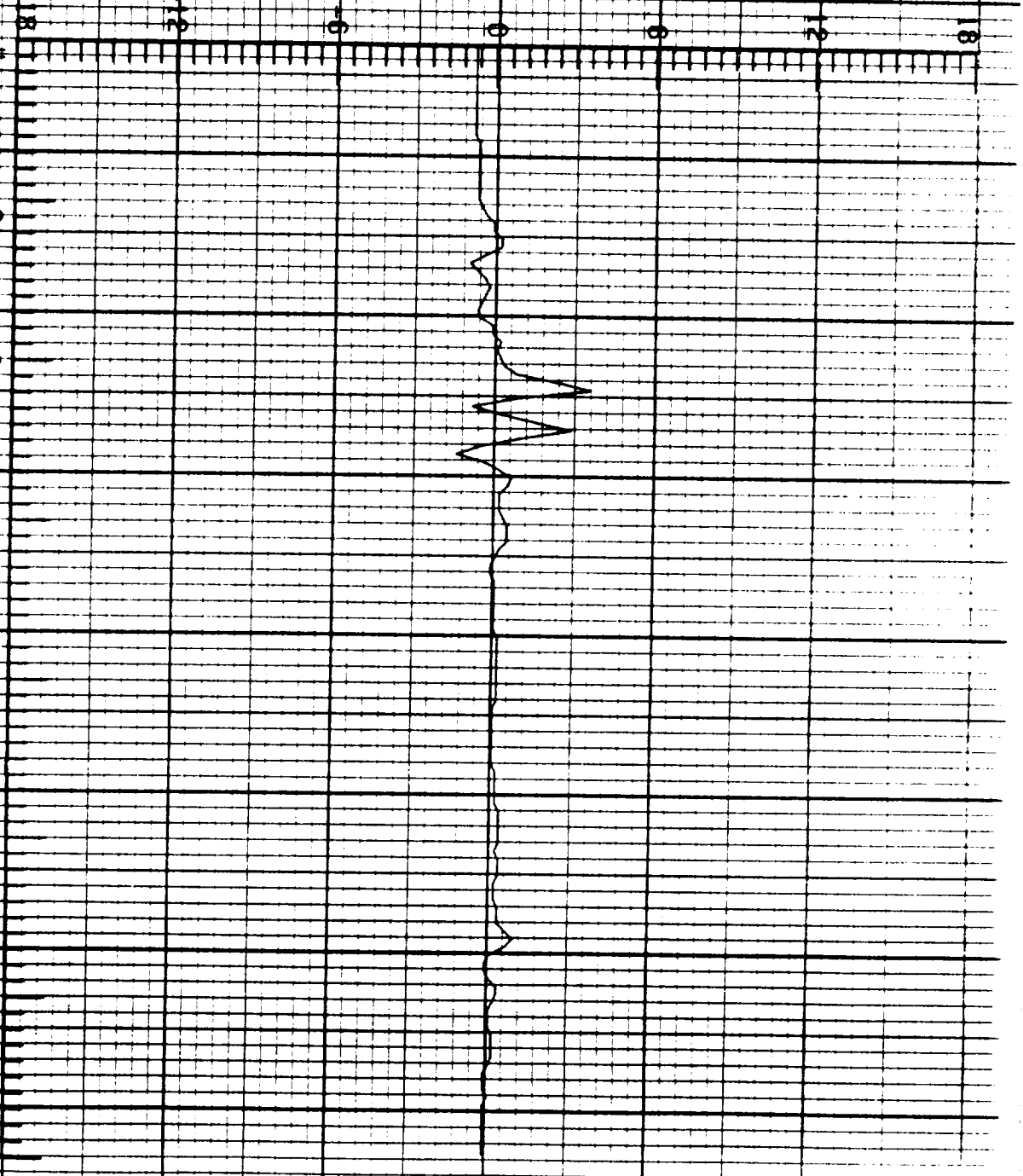
F106 LIGHTNING/84.015 LEC B RUN NO. 4

N.002

D_{w1} A/m²



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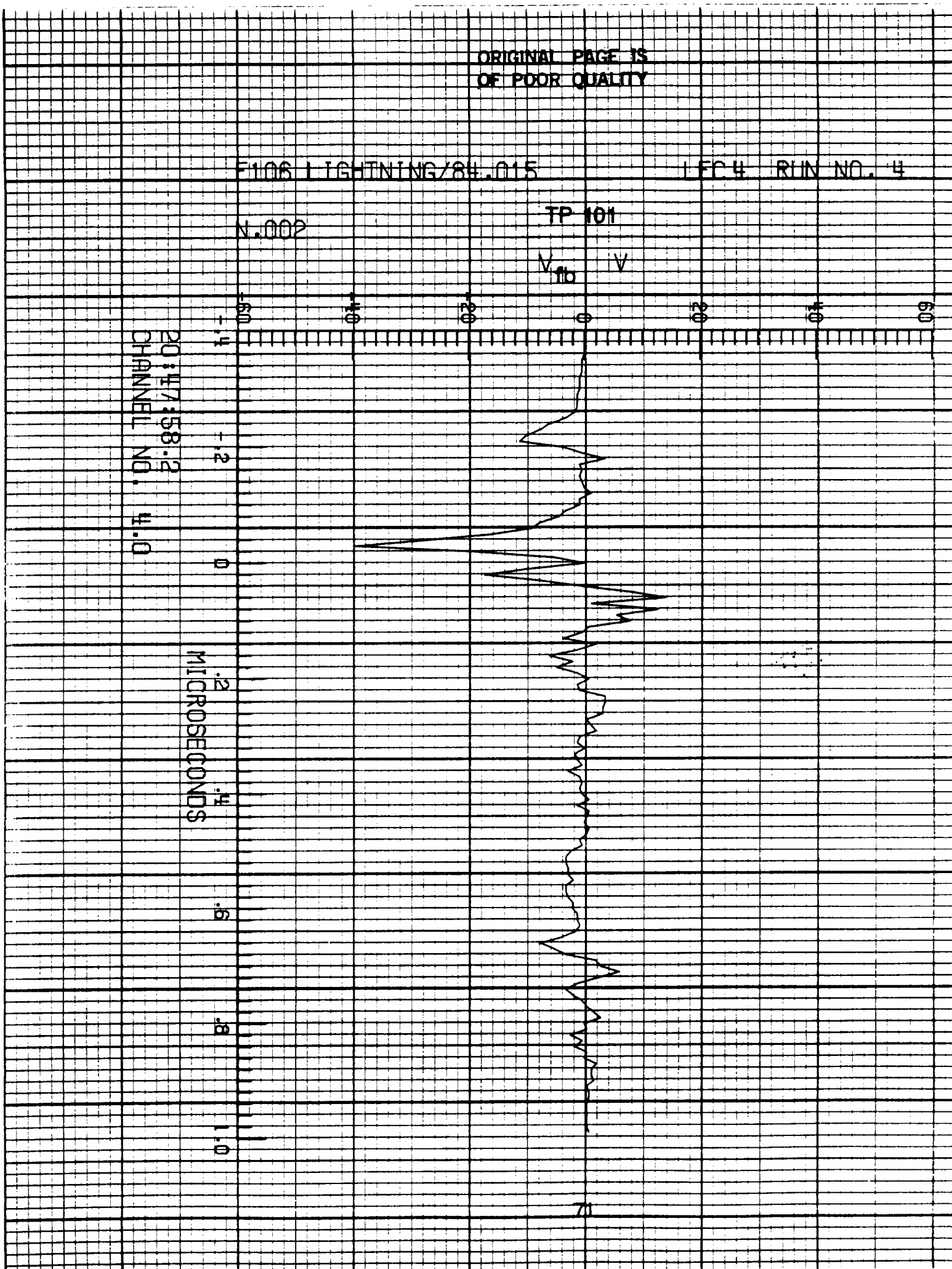

F106 LIGHTNING/84.015 LFC4 RUN NO. 4

N.002

I_n A

-6 -3 0 3 6 x 10^3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:47:58.2

CHANNEL NO. 4.1

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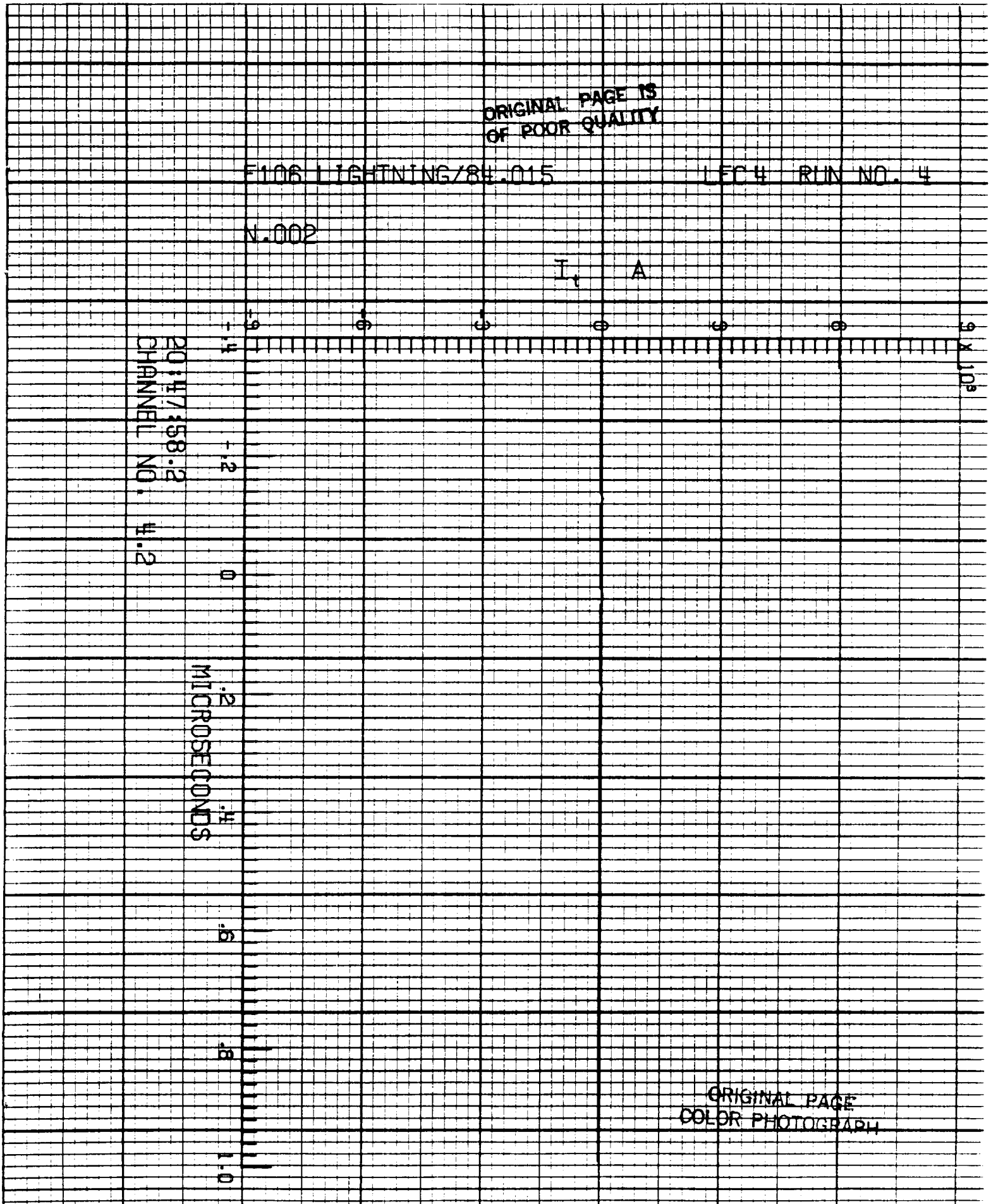
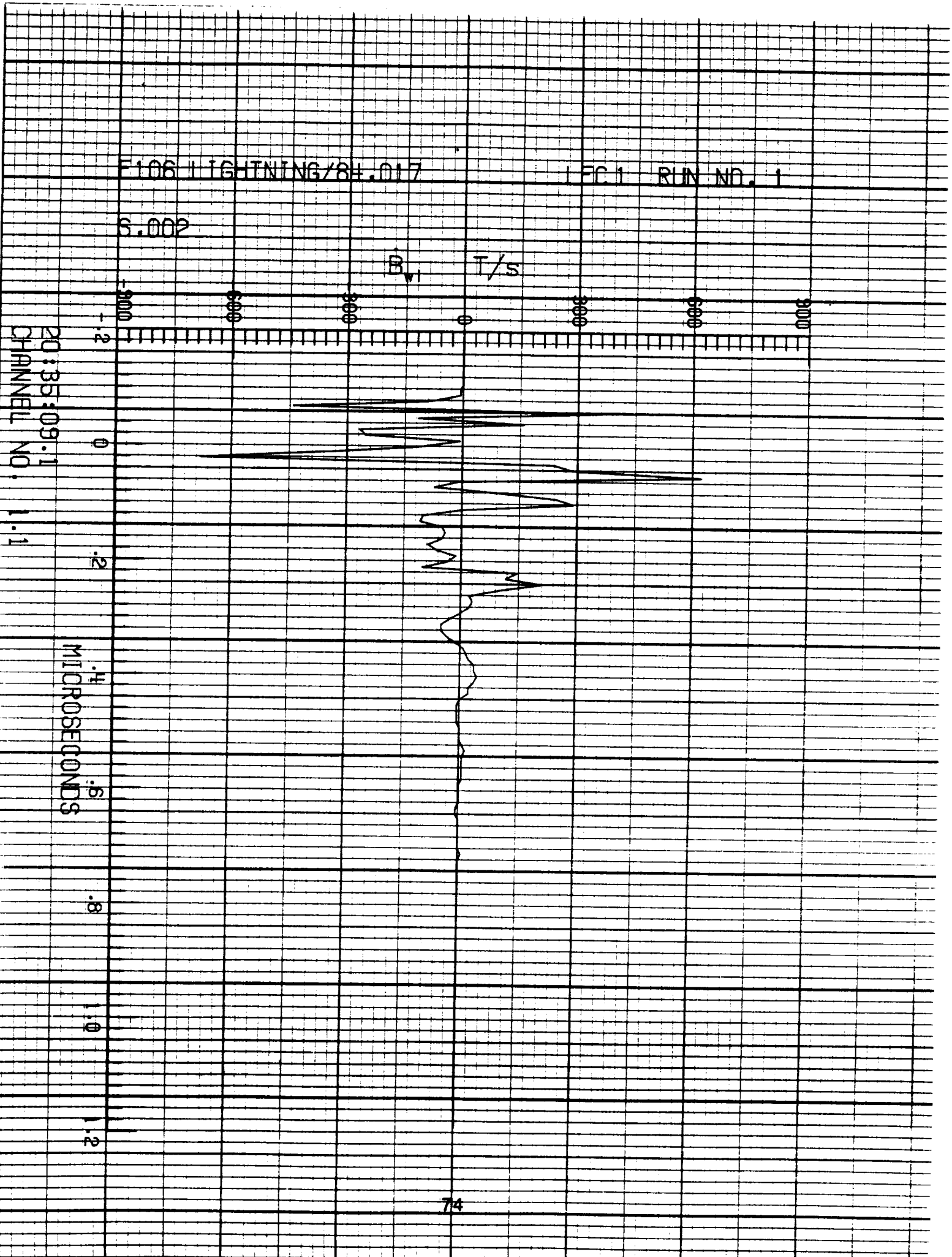


ORIGINAL PAGE
COLOR PHOTOGRAPH


F106 LIGHTNING/84.017
LFC1 RUN NO. 1
S.002
$\dot{B}_{w1}$ T/s
-900
-600
-300
0
300
600
900
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
20:35:09.1
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F106 LIGHTNING/84.017 LFC2 RUN NO. 1

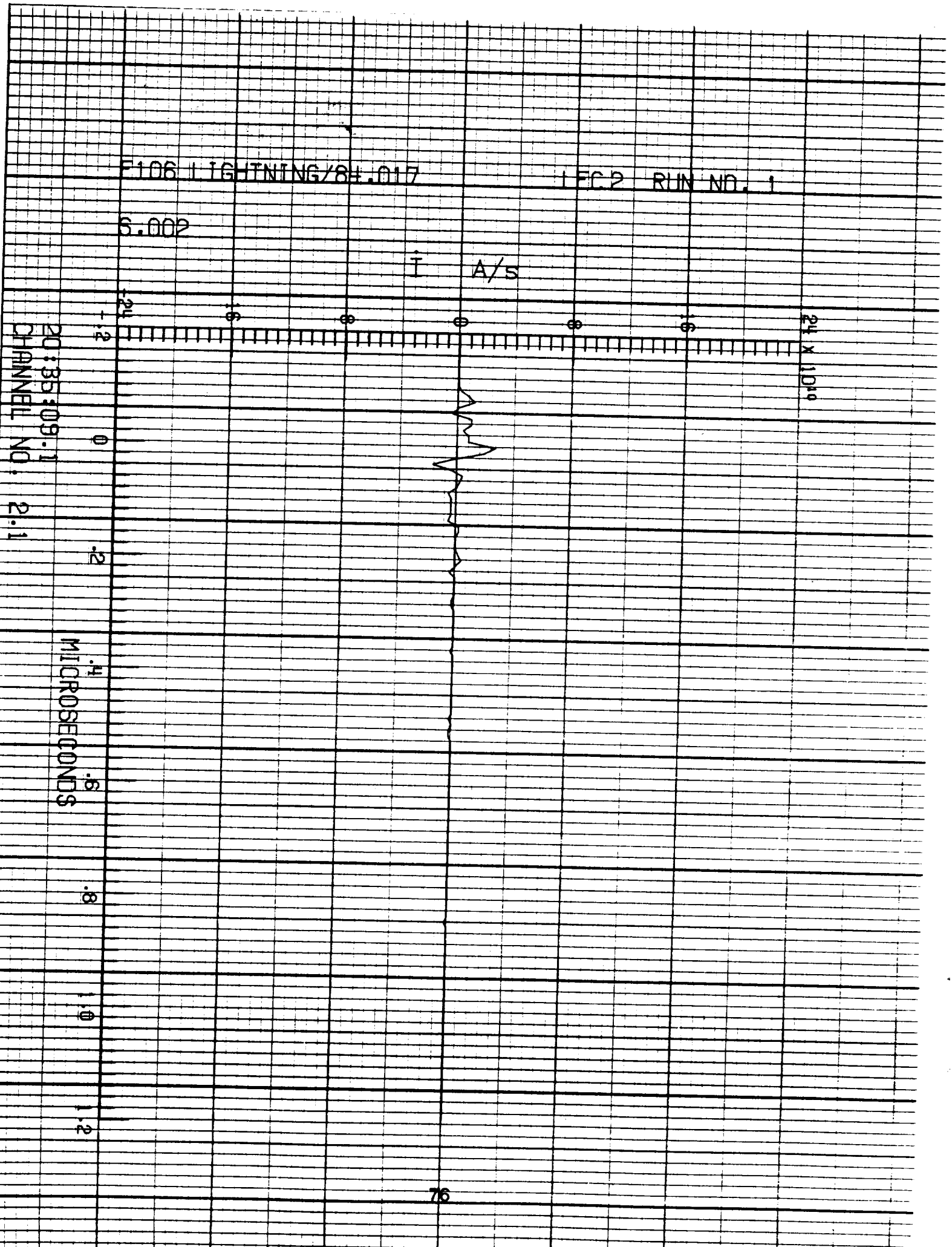
S.002

$\dot{D}_t$ A/m^2

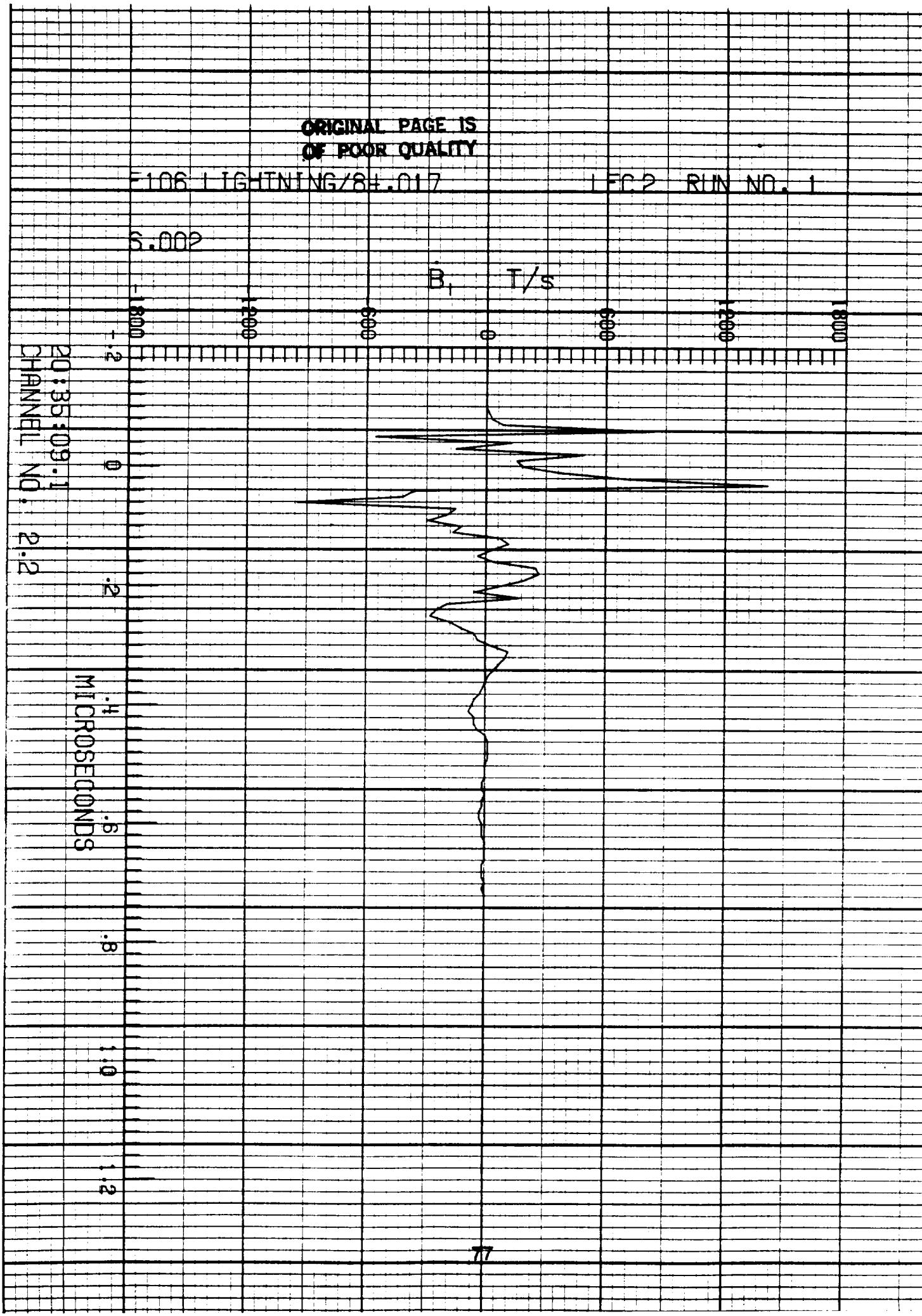
-.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2

20:35:09.1
CHANNEL NO: 2.0

MICROSECONDS


F106 LIGHTNING/84.017
LFC2 RUN NO. 1
6.002
Î A/s
-24
-16
-8
0
8
16
24 x 10^10
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
20:35:09.1
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY



F106 LIGHTNING/84.017 IFC3 RUN NO. 1

6.00P

$\dot{D}_{w1}$ A/m^2

-1.2 0 .2 .4 .6 .8 1.0 1.2

MICROSECONDS

20:35:09.1

CHANNEL NO. 3.1

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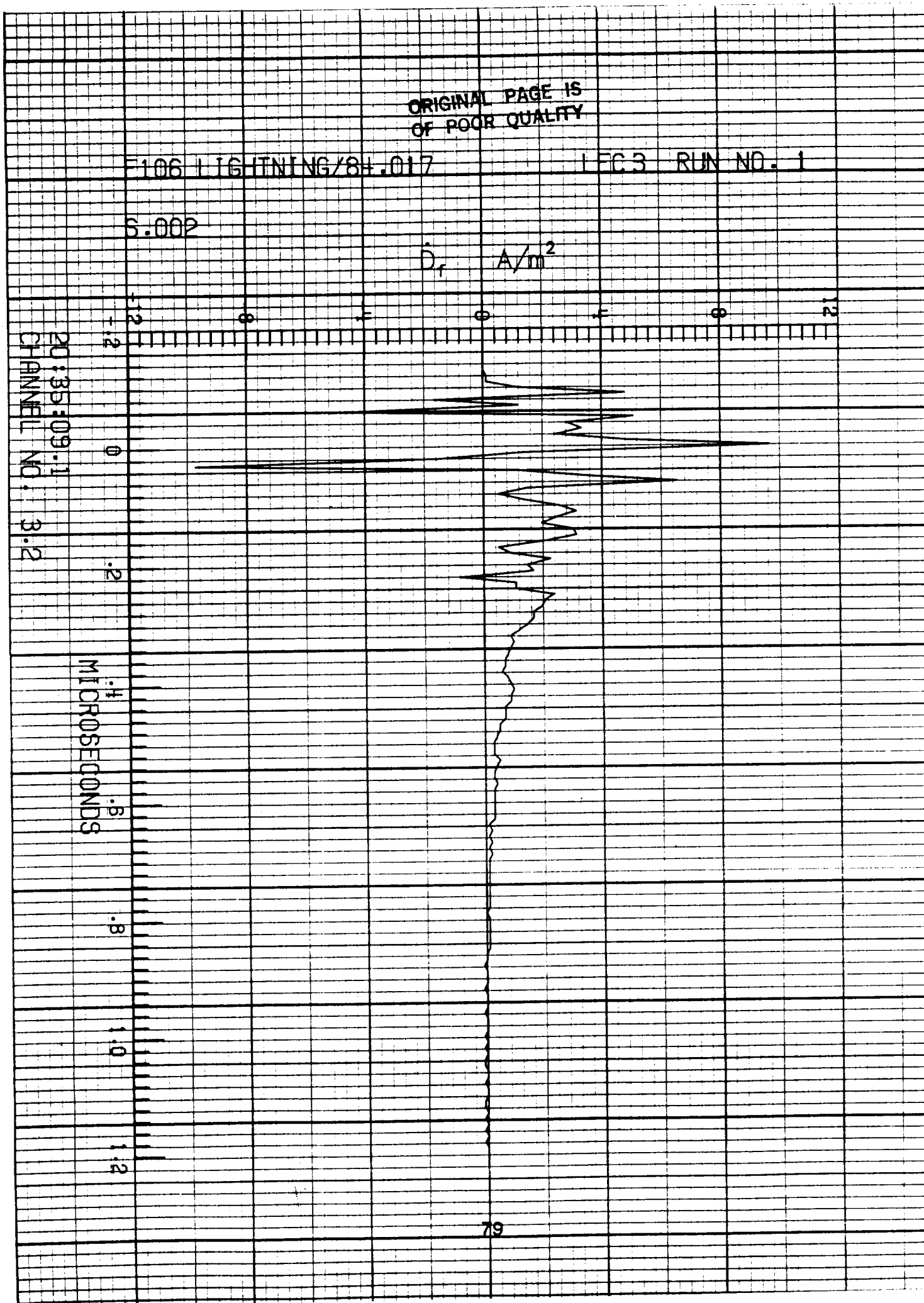
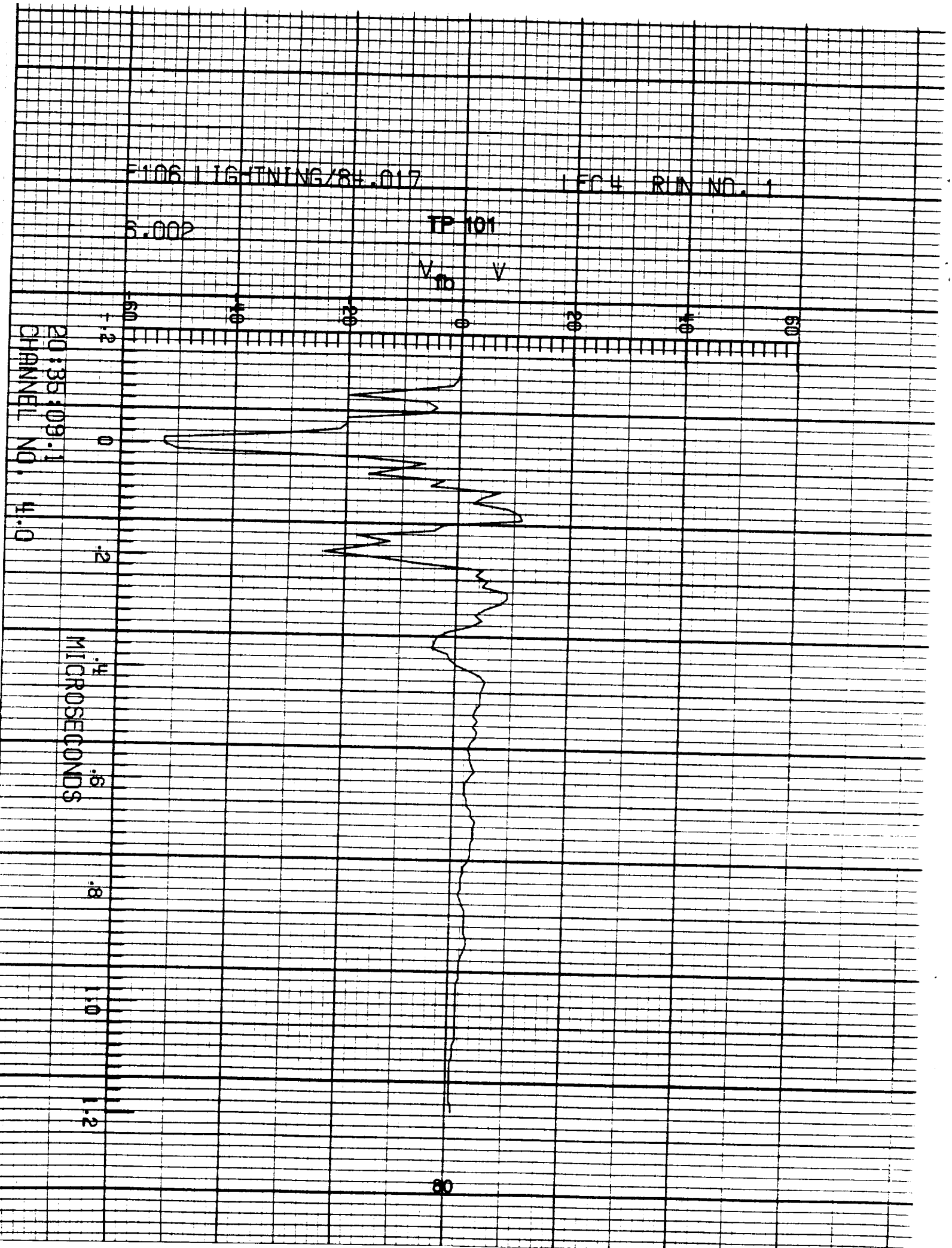
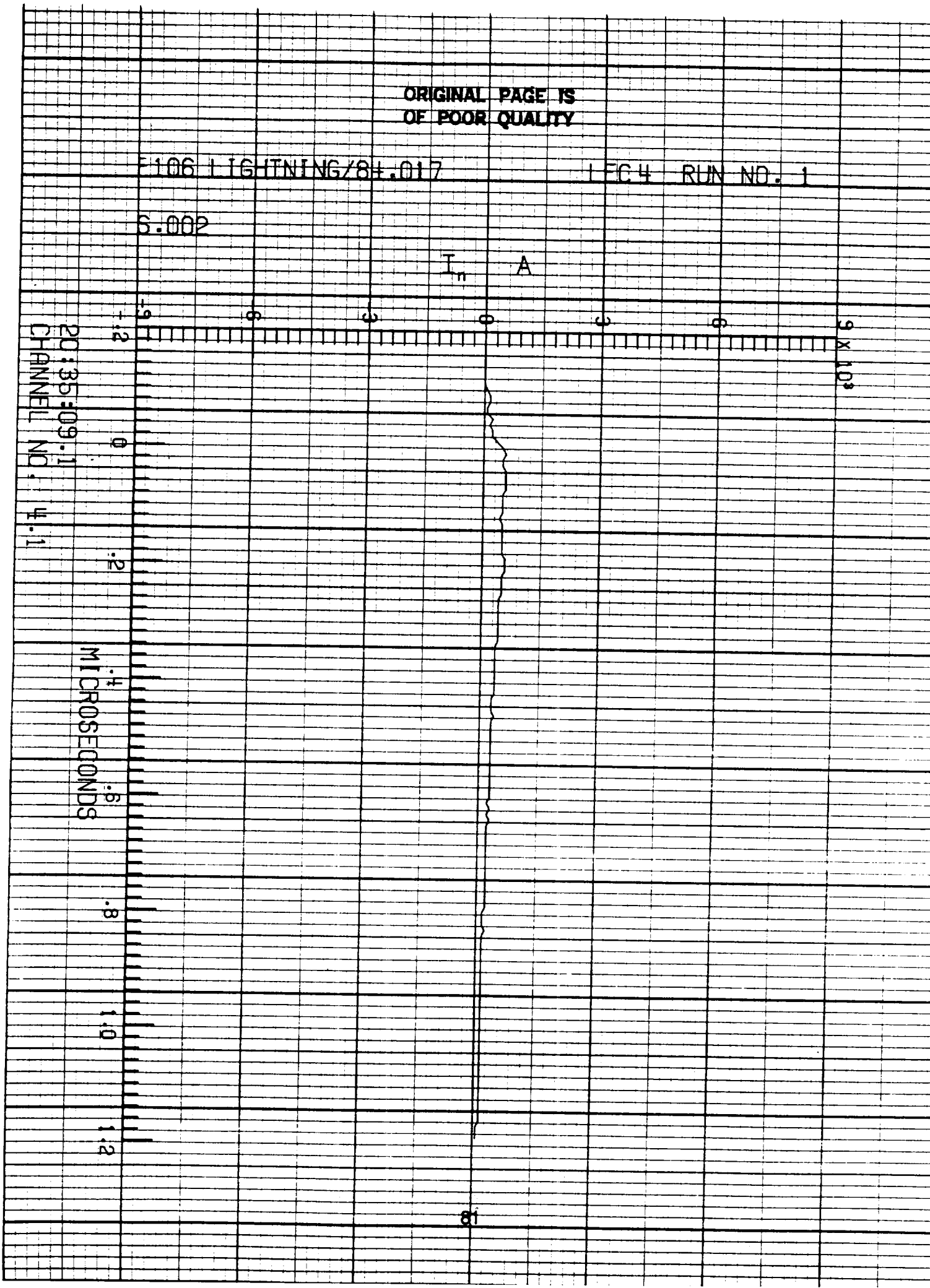
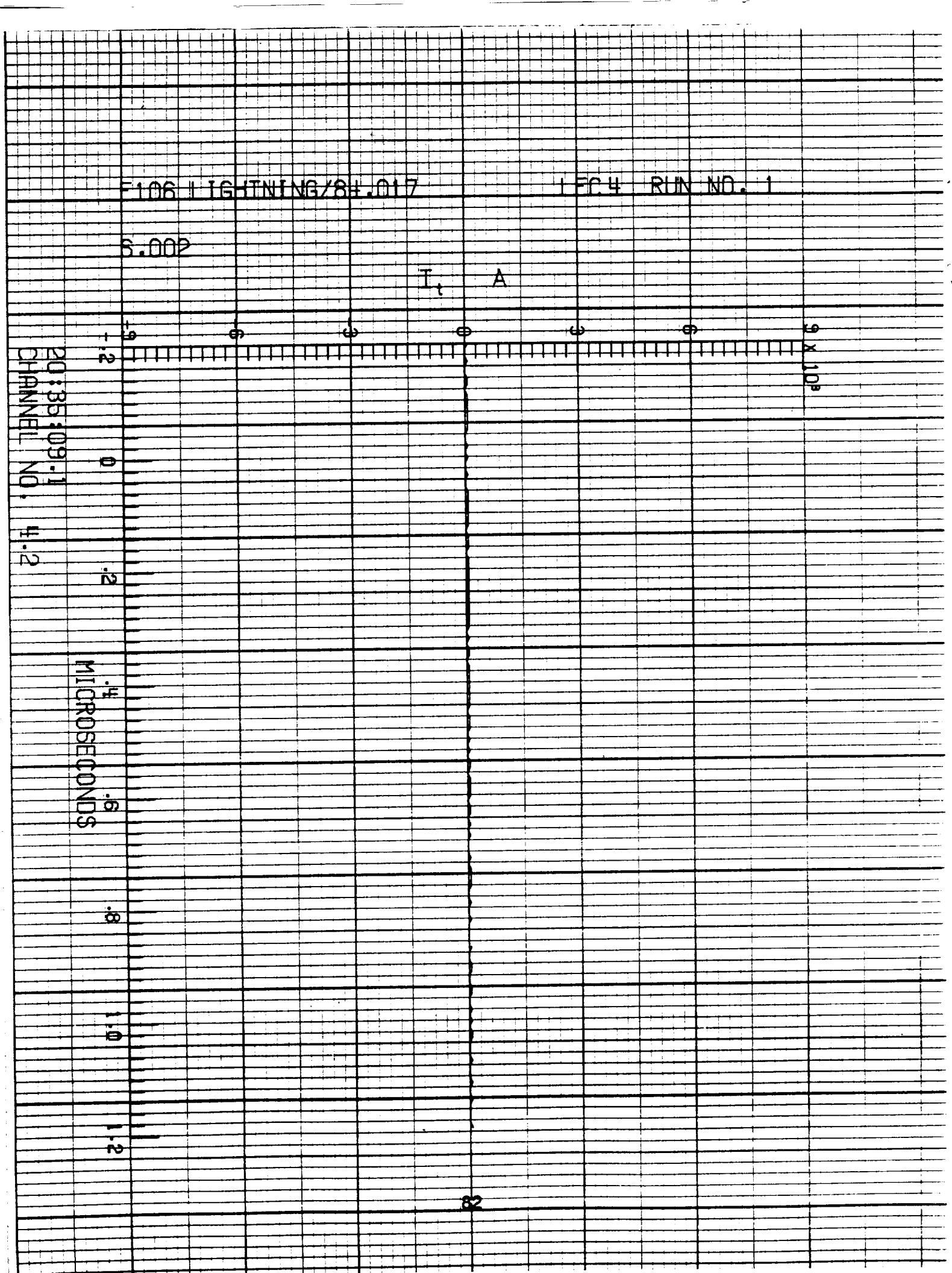


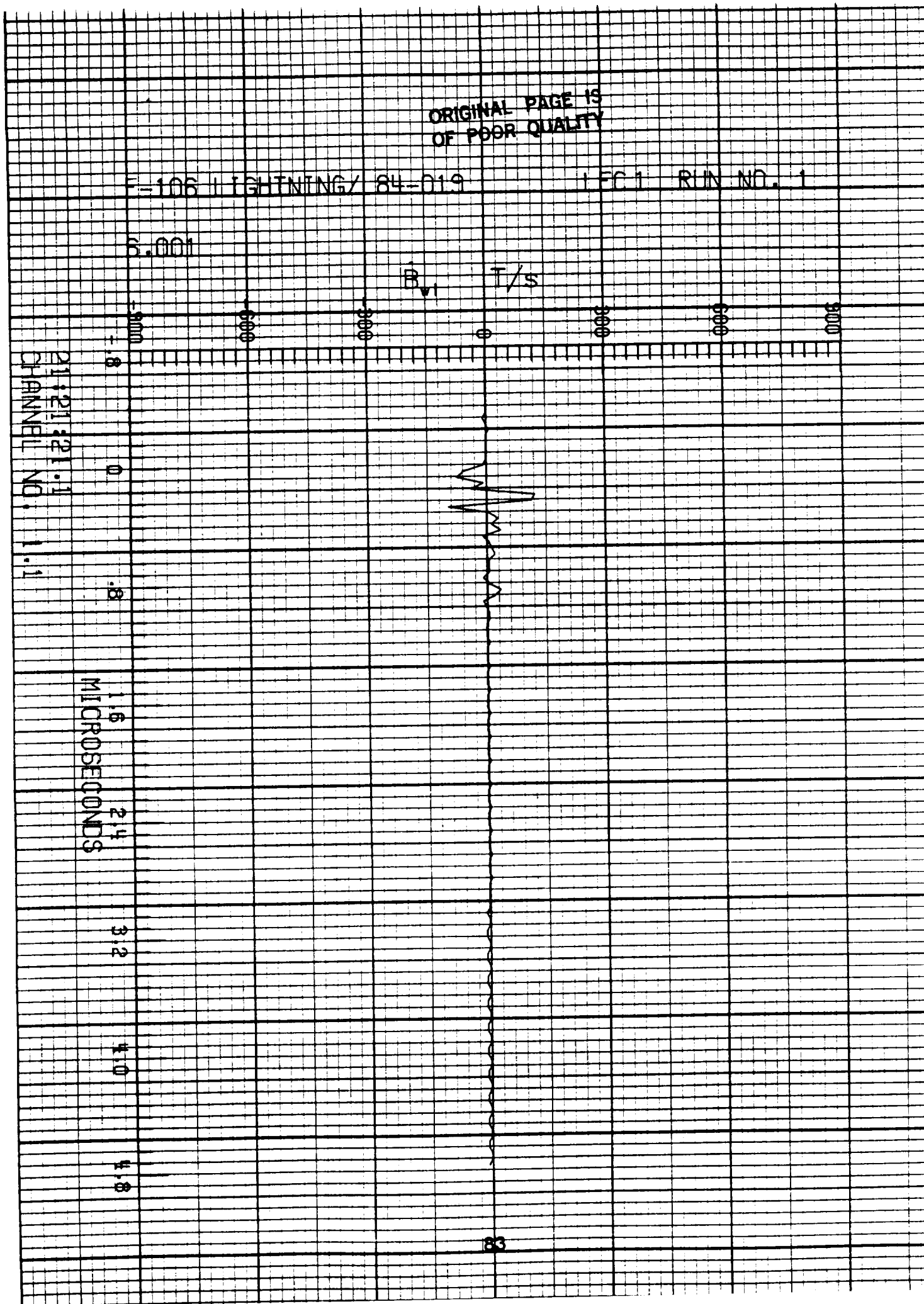

F106 LIGHTNING/84.017
LFC4 RUN NO. 1
6.002
TP 101
V_{fb} V
-60
-40
-20
0
20
40
60
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
20:35:09.1
CHANNEL NO. 4.0
80

ORIGINAL PAGE IS
OF POOR QUALITY




F106 LIGHTNING/84.017
LFC4 RUN NO. 1
6.002
I_t A
-9
-6
-3
0
3
6
9 x 10^8
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
20:35:09.1
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-019 LFC 1 RUN NO. 1

6.001

B_{wr} T/S

-800 -600 -400 -200 0 200 400 600 800

-1.6 -1.2 -.8 -.4 0 .4 .8 1.2 1.6

CHANNEL NO. 1 21:21:21.1

MICROSECONDS

C-2

ORIGINAL PAGE IS
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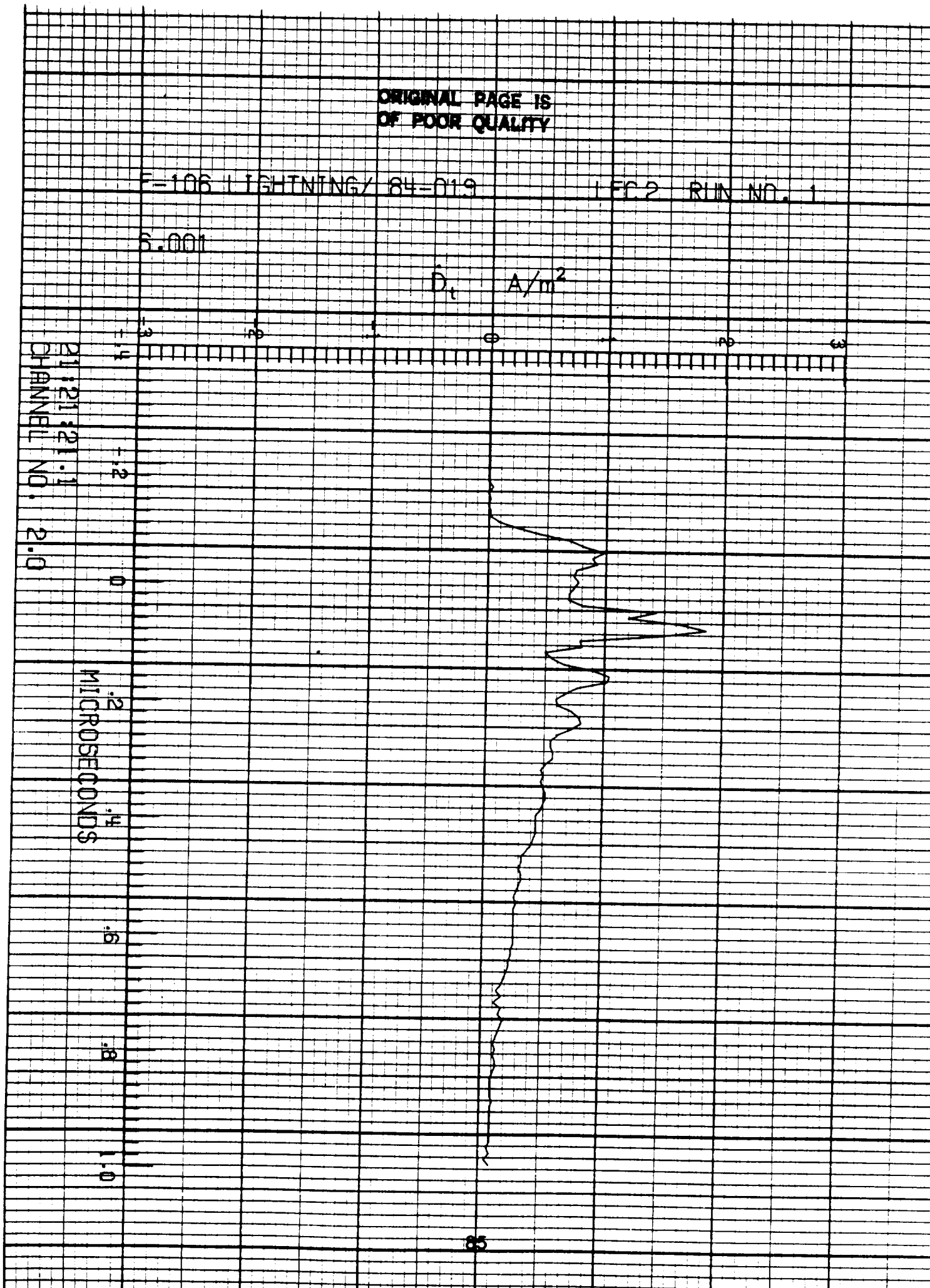
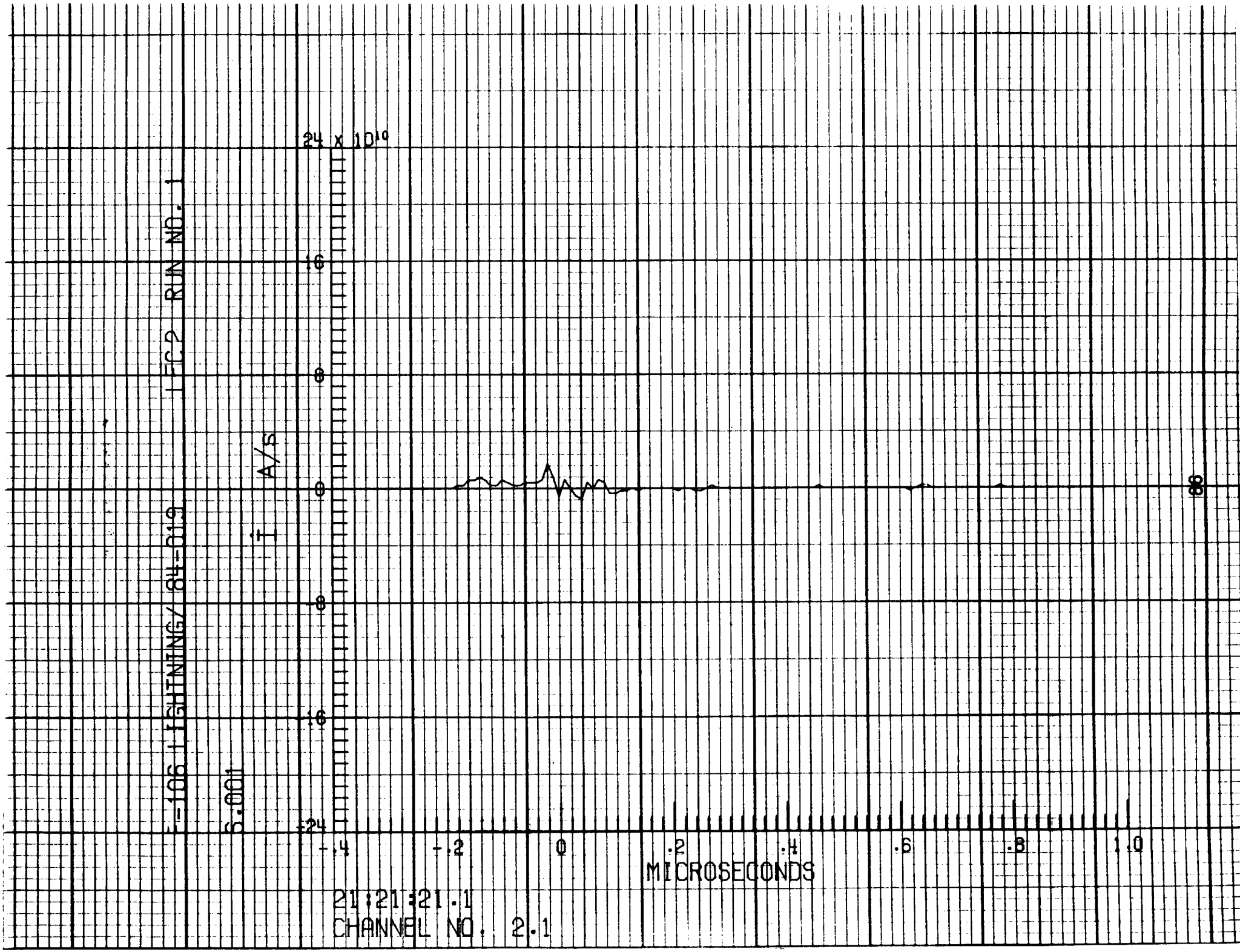
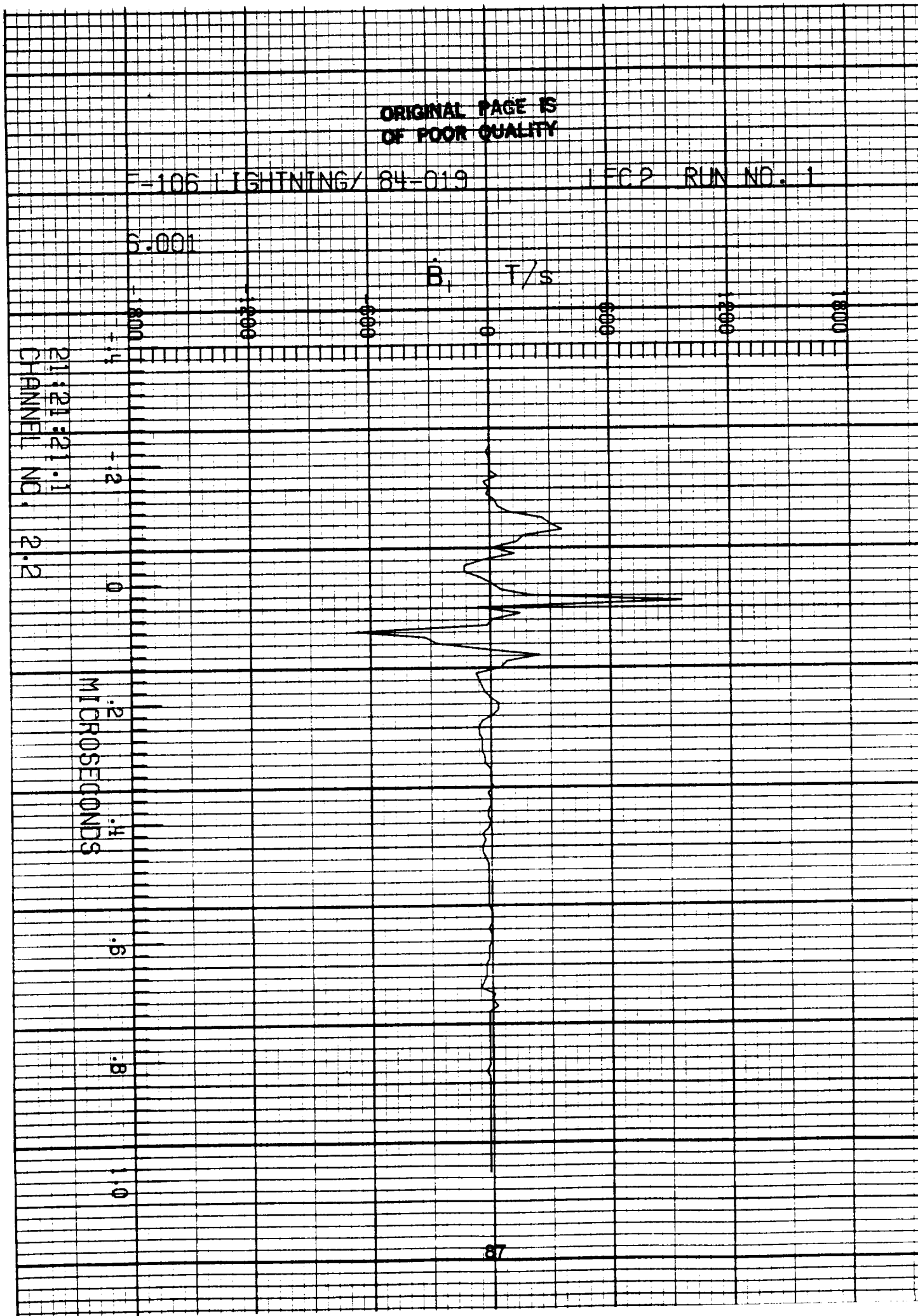
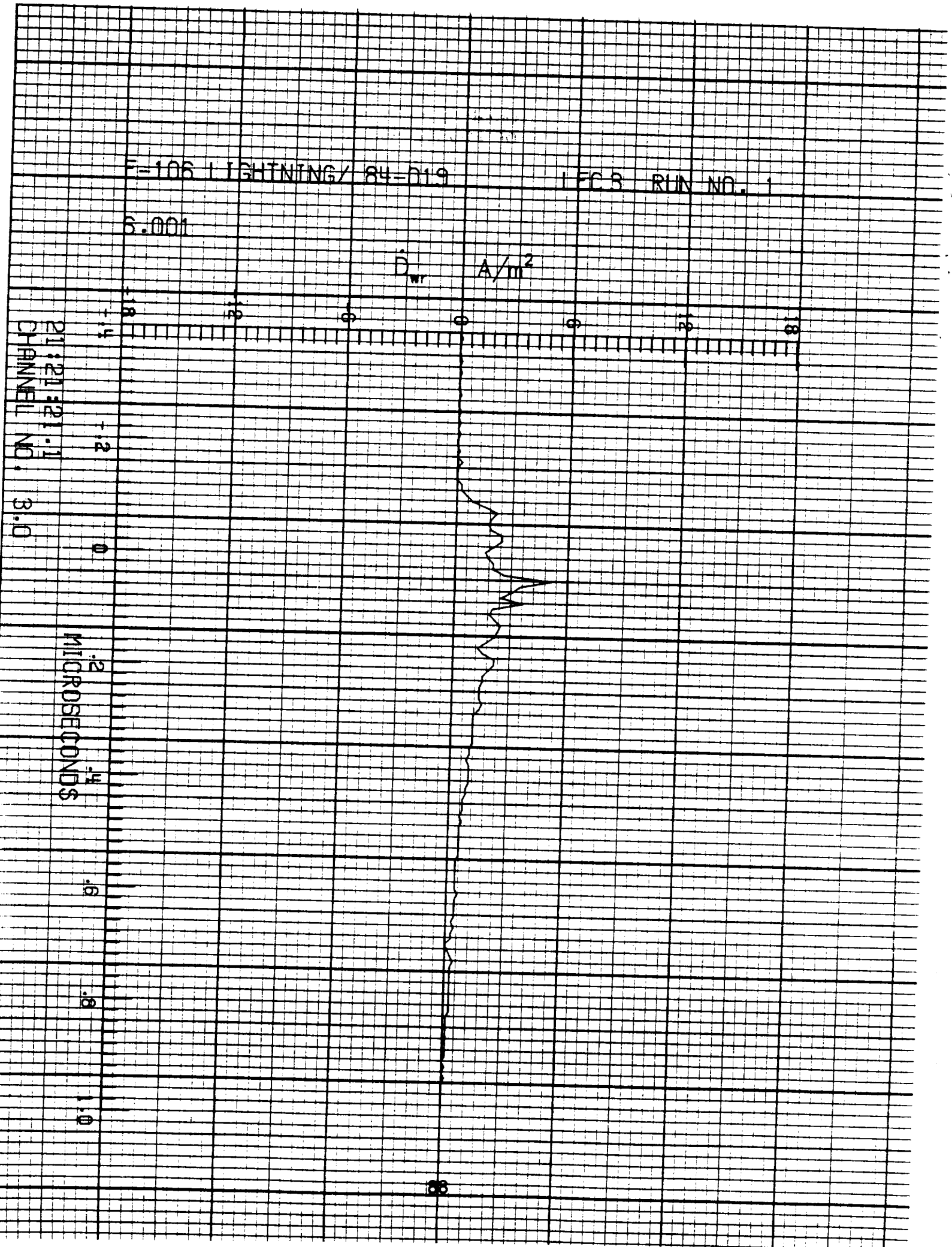



24 x 10^19
16
8
0
-8
-16
-24
dI/dt A/S
E=106 LIGHTNING/ 84-219 FC2 RUN NO. 1
6.001
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:21:21.1
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-019
LFC3 RUN NO. 1
6.001
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:21:21.1
CHANNEL NO. 3.0

ORIGINAL PAGE IS
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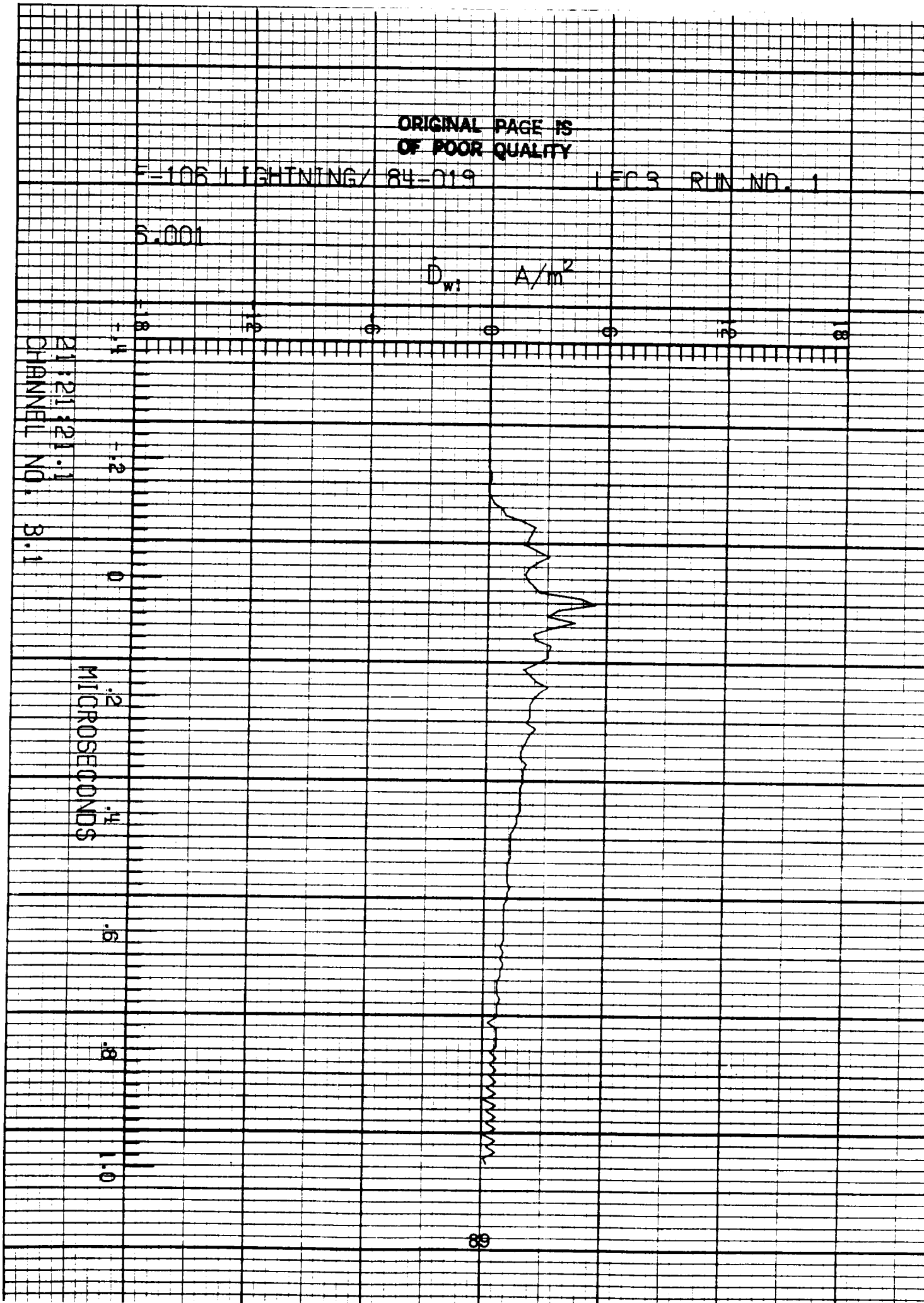

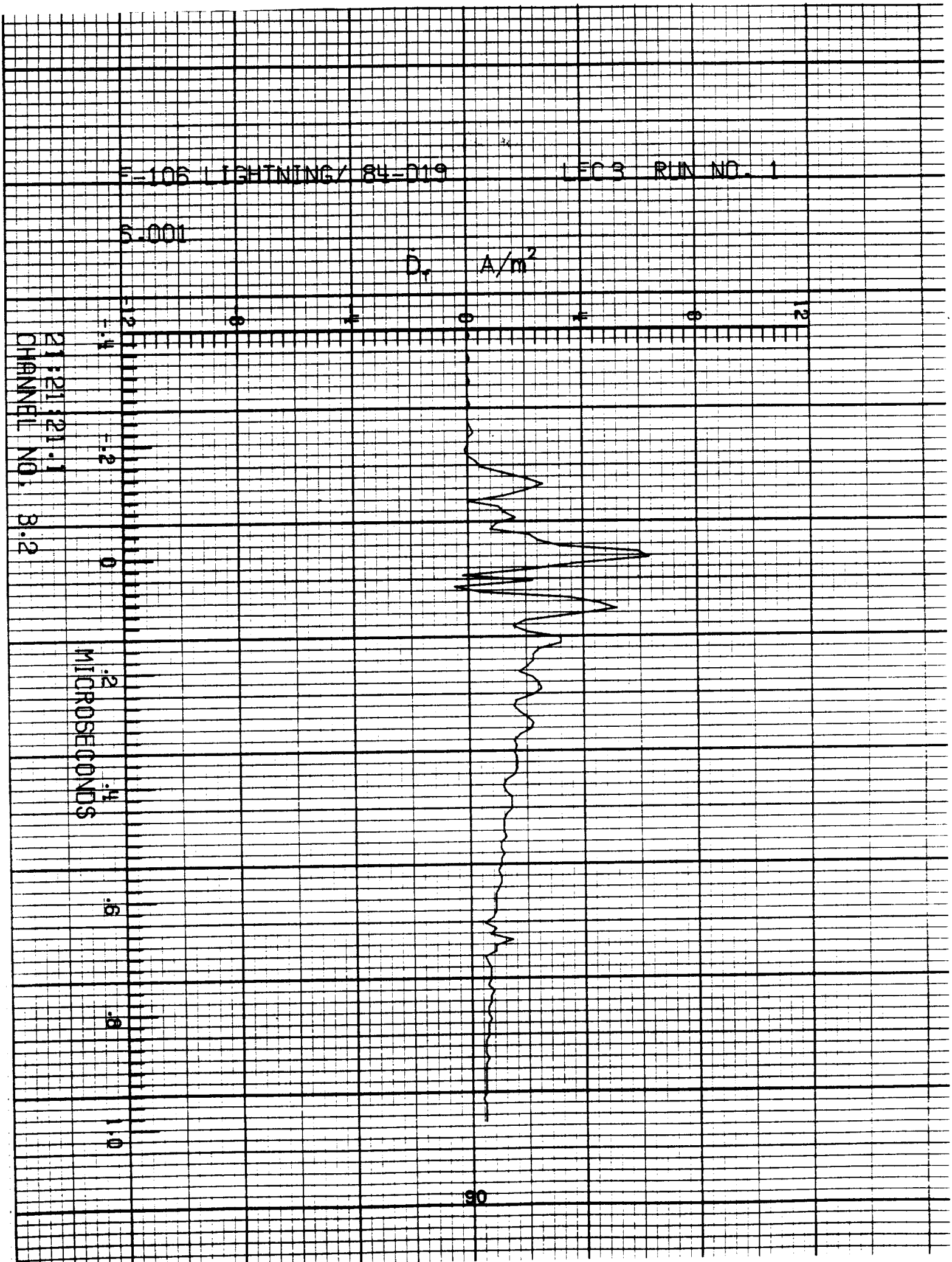
F-106 LIGHTNING/ 84-019
LEC 3 RUN NO. 1
6.001
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:21:21.1
CHANNEL NO. 3.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-019 LEC 4 RUN NO. 1

6.001

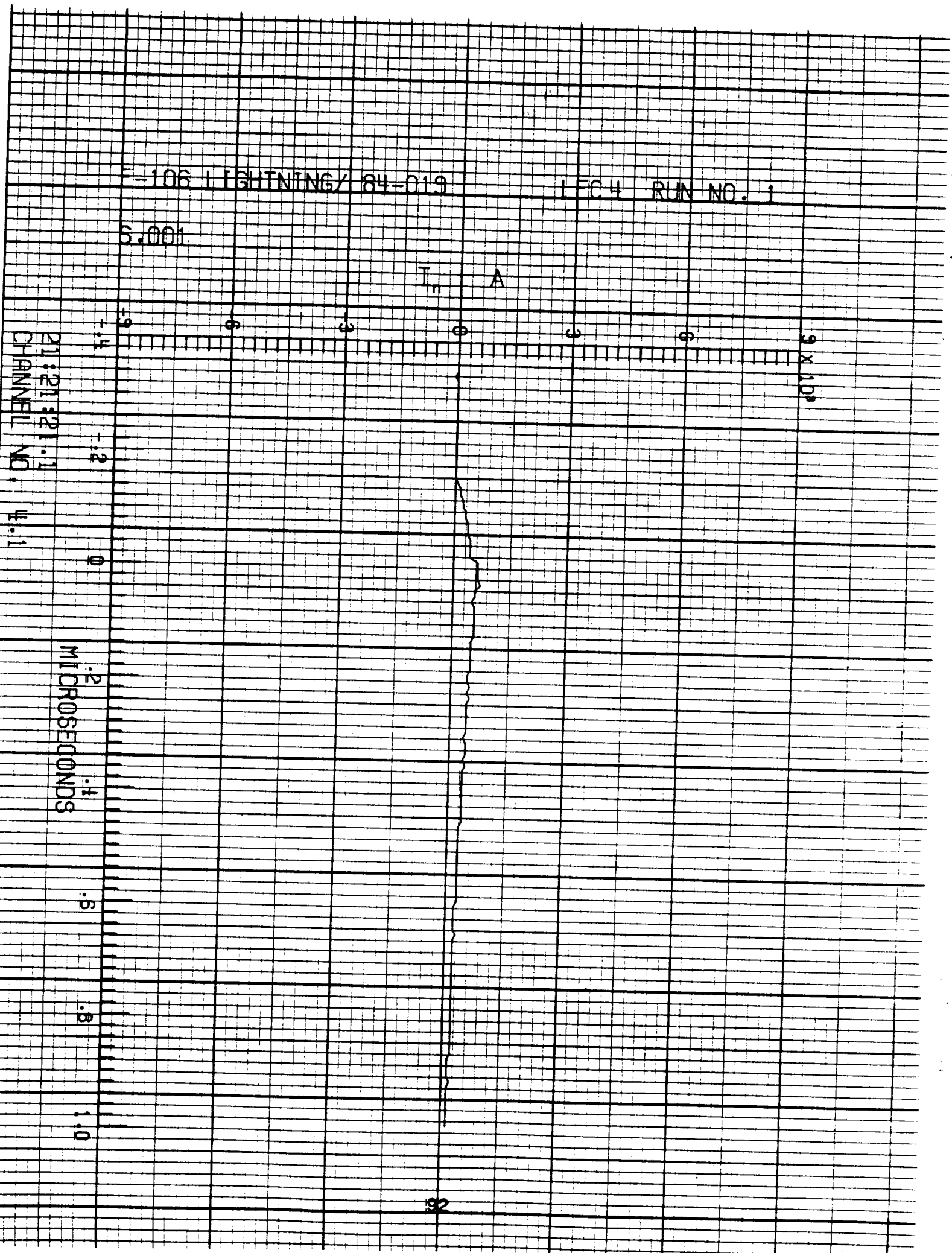
V_{fa} V

-60 -40 -20 0 20 40 60

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

CHANNEL NO. 21:21:21:1 4.0


F-106 LIGHTNING/ 84-019
LEC4 RUN NO. 1
6.001
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:21:21.1
CHANNEL NO. 4.1

ORIGINAL PAGE IS
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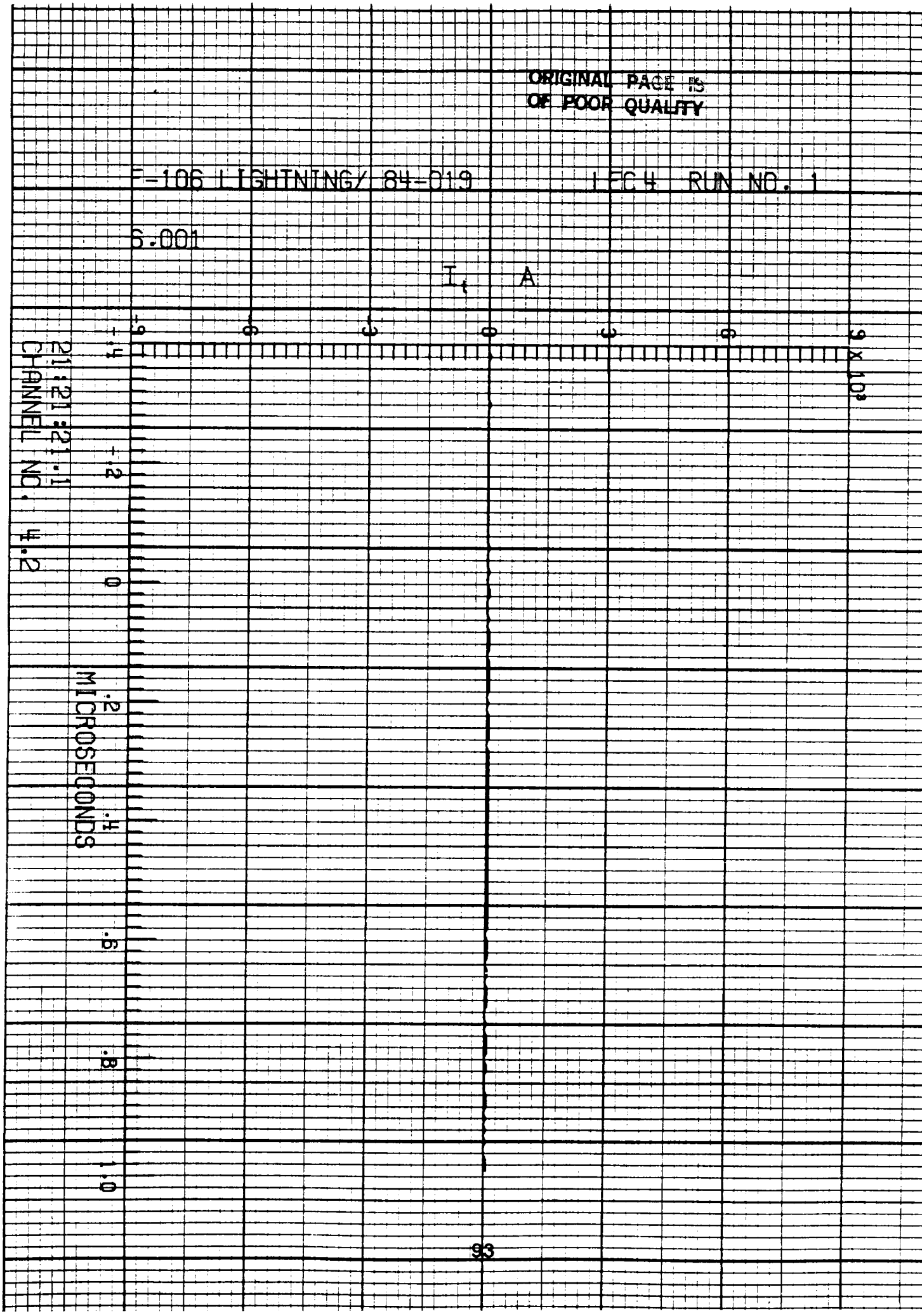

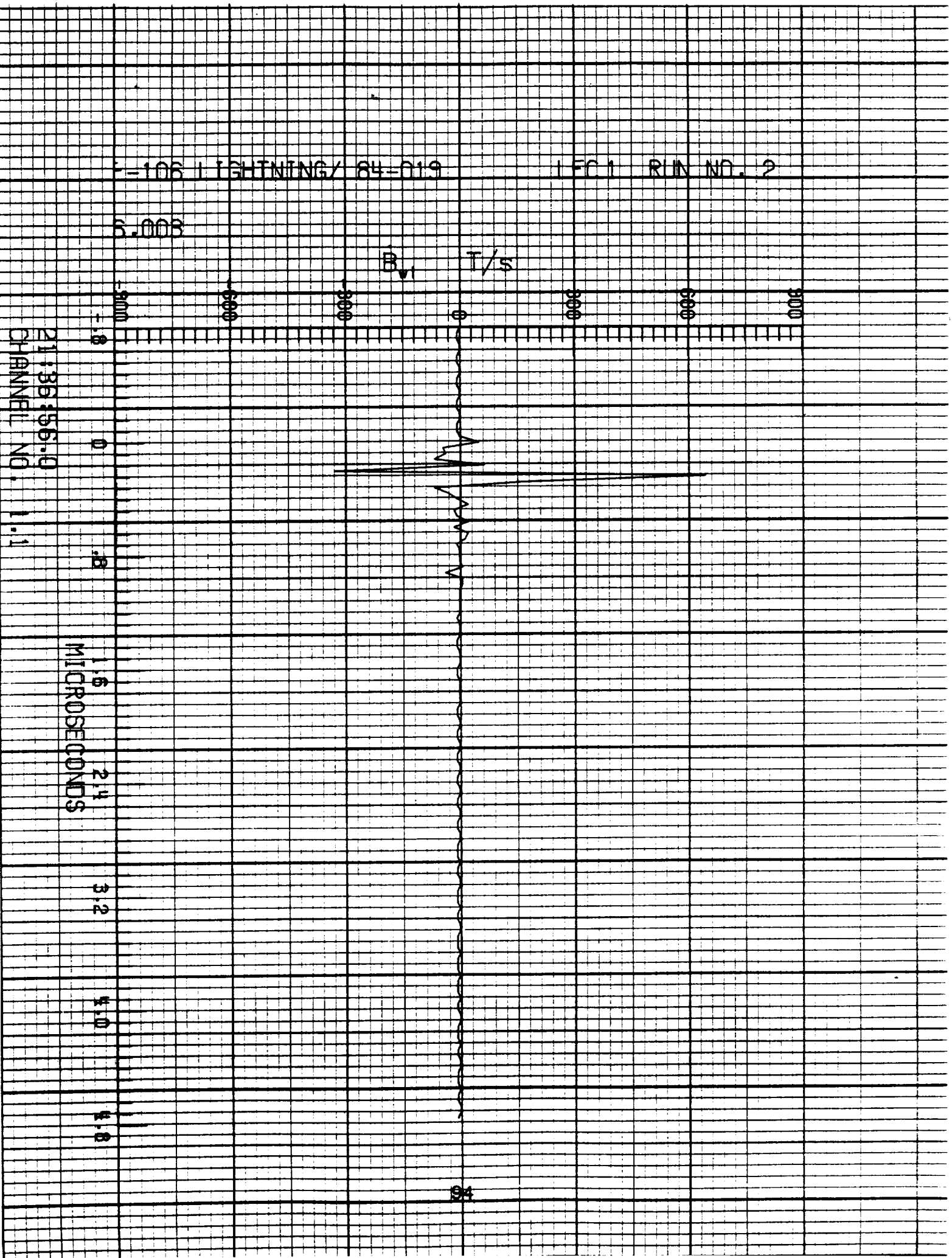
F-106 LIGHTNING/ 84-019
LFC1 RUN NO. 2
6.008
B_{w1} T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
21:36:56.0
CHANNEL NO. 1.1

ORIGINAL PAGE IS
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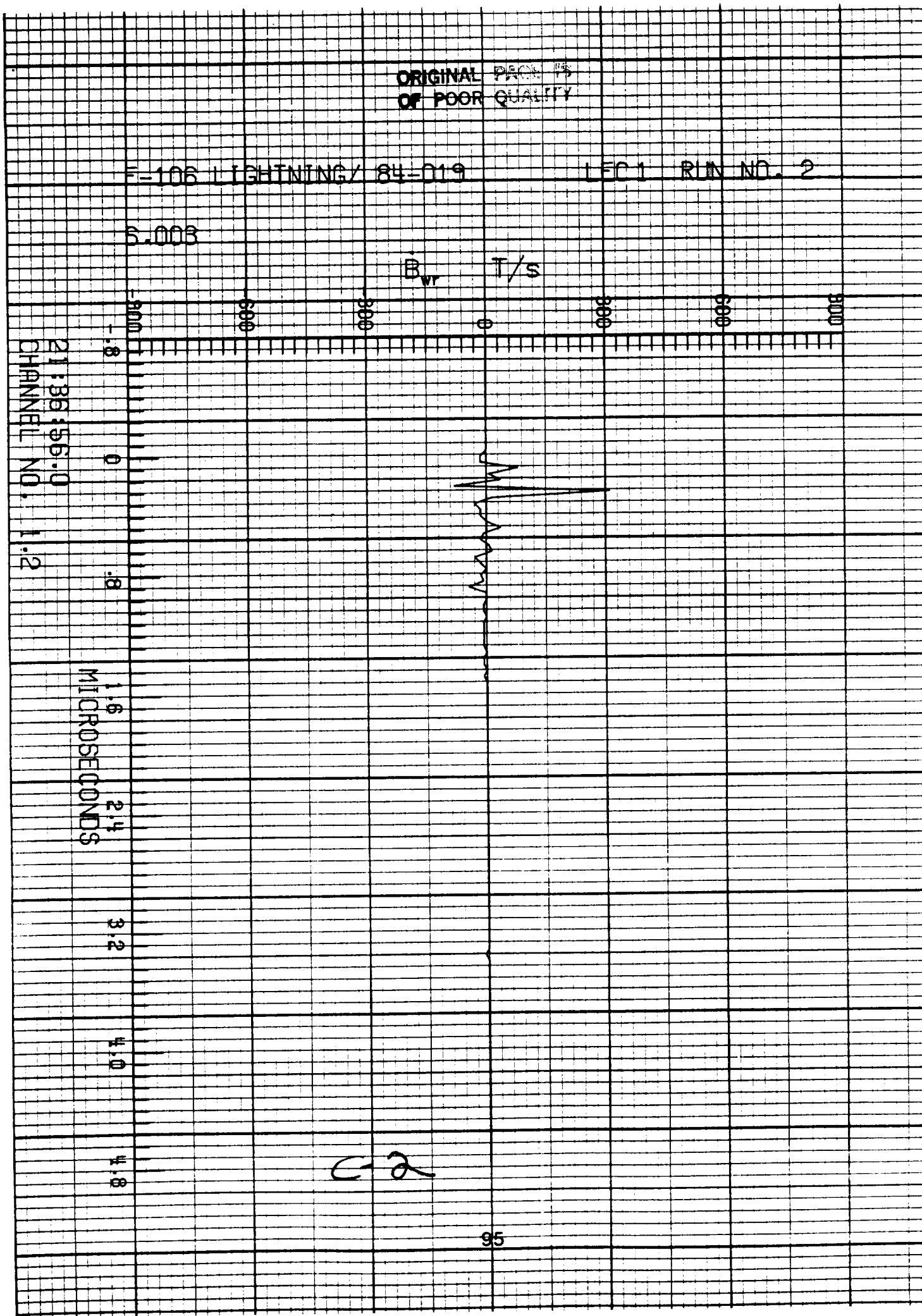

C-2

F-106 LIGHTNING/ 84-019 LFC 2 RUN NO. 2

6.008

$\hat{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:36:56.0

CHANNEL NO. 2.0

ORIGINAL PAGE IS
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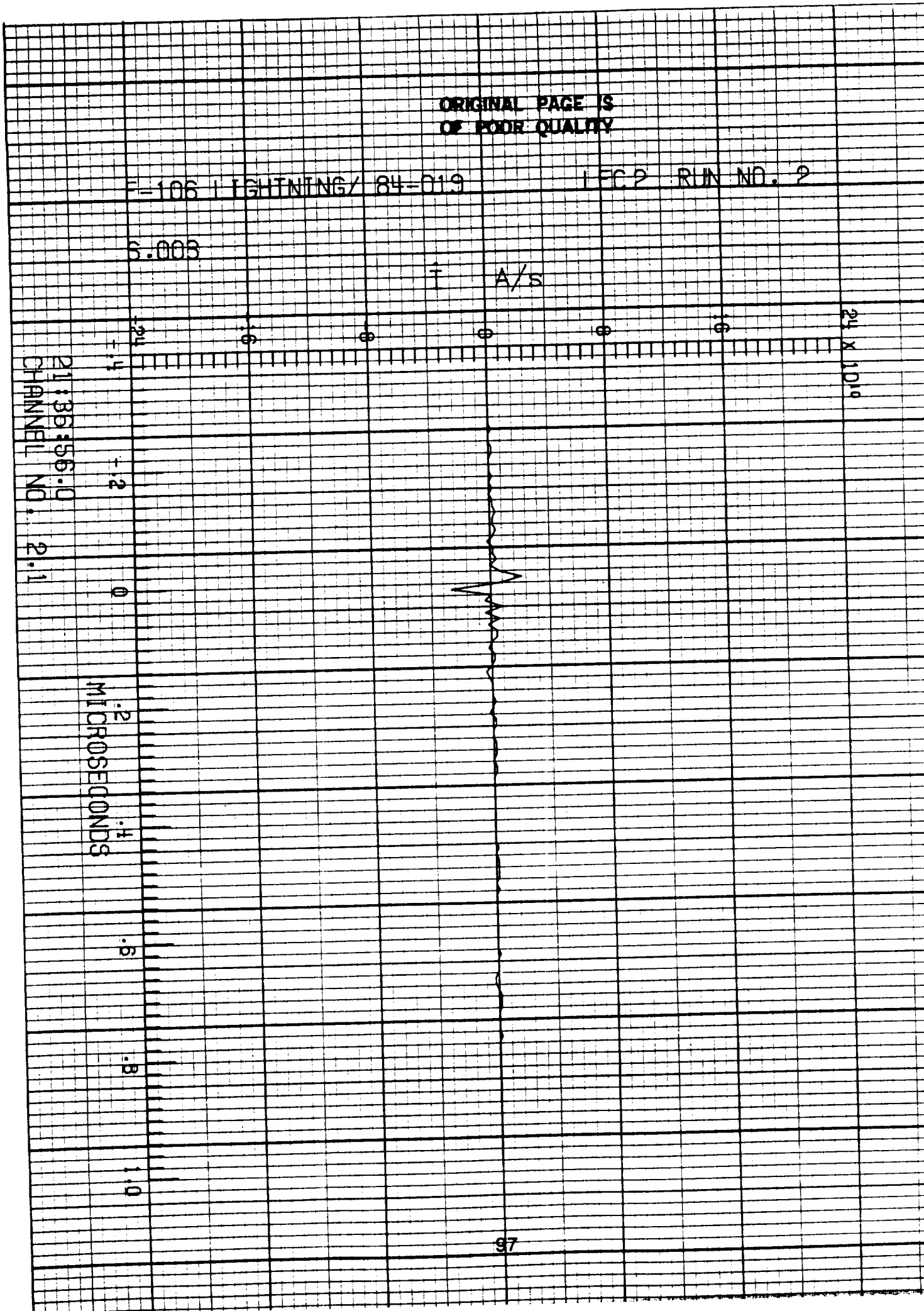

=106 LIGHTNING/ 84-019
FC2 RUN NO. 2
6.008
$\dot{B}_t$ T/s
-1000
-800
-600
-400
-200
0
200
400
600
800
1000
-1.4
-1.2
0
2.2
21:36:56.0
CHANNEL NO. 2
.2
MICROSECONDS
.4
.6
.8
1.0

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-019 IFCS RUN NO. 2

6.003

$\dot{D}_{wr}$ A/m^2

-1.8 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:36:56.0
CHANNEL NO. 3.0

F-106 LIGHTNING/ 84-019 FC3 RUN NO. 2

6.006

$\dot{D}_{wi}$ A/m^2

-1.8 -1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:38:56.0
CHANNEL NO. 3.1

ORIGINAL PAGE IS
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F=106 LIGHTNING/ 84-019 LFC3 RUN NO. 2

6.008

$\dot{D}_f$ A/m^2

-12 -8 -4 0 4 8 12

21:36:56.0
CHANNEL NO. 3.2

+4 +2 0 -2 -4 -6 -8 -10

MICROSECONDS

F-106 LIGHTNING/ 84-019 LEC4 RUN NO. 2

6.008

V_{fa} V

-80 -40 -20 0 20 40 60 80

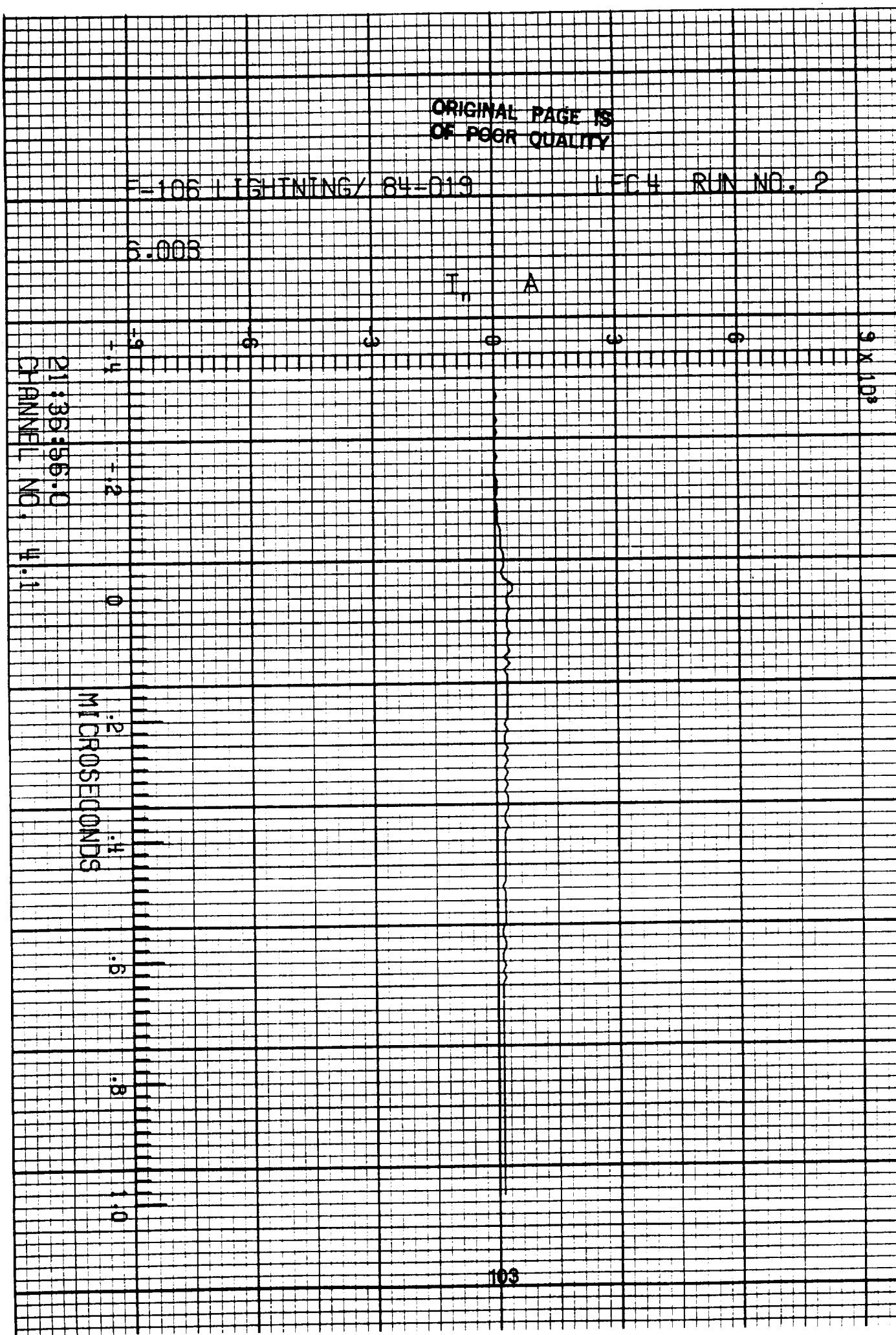
-.4 -.2 0 .2 .4 .6 .8 1.0

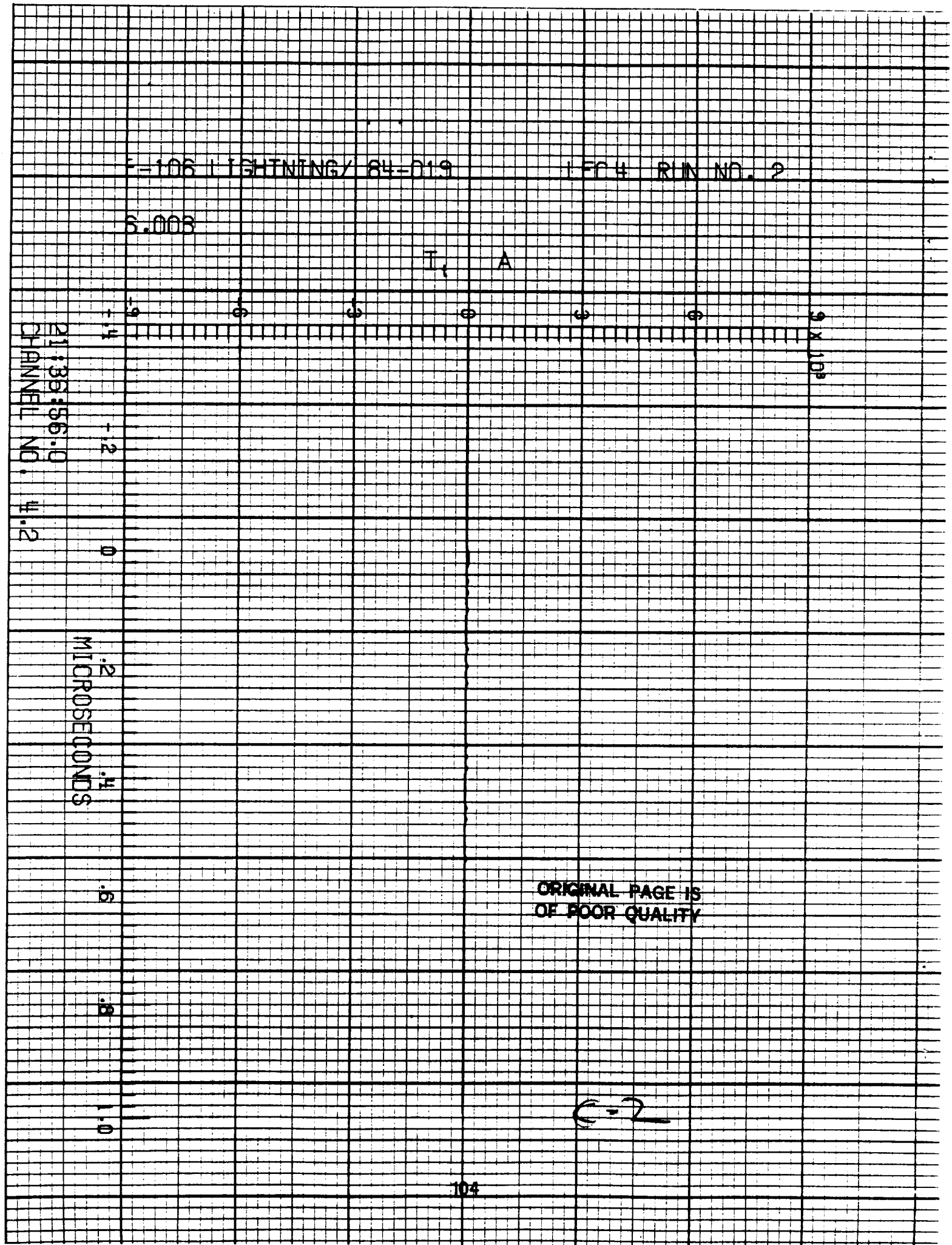
MICROSECONDS

21:36:56.0

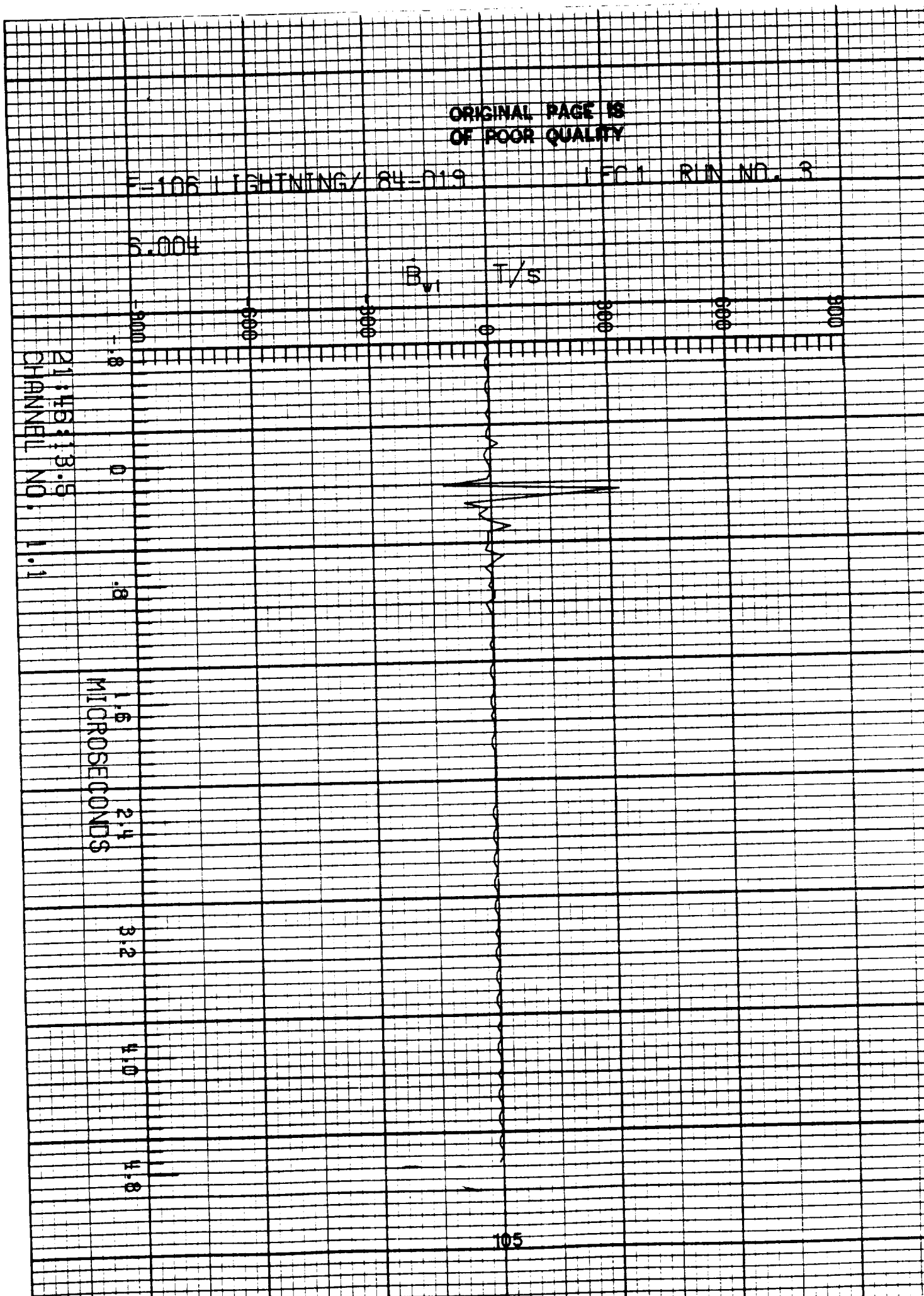
CHANNEL NO. 4.0

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-019
LEC 4 RUN NO. 2
6.008
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:36:56.0
CHANNEL NO. 4.2
ORIGINAL PAGE IS
OF POOR QUALITY
C-2

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-019 FC1 RUN NO. 3

6.004

$\dot{B}_{wr}$ T/s

-600 -400 -200 0 200 400 600

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

21:46:13.5

CHANNEL NO. 1:2

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F-106 LIGHTNING/ 84-019 LFC2 RUN NO. 3

6.004

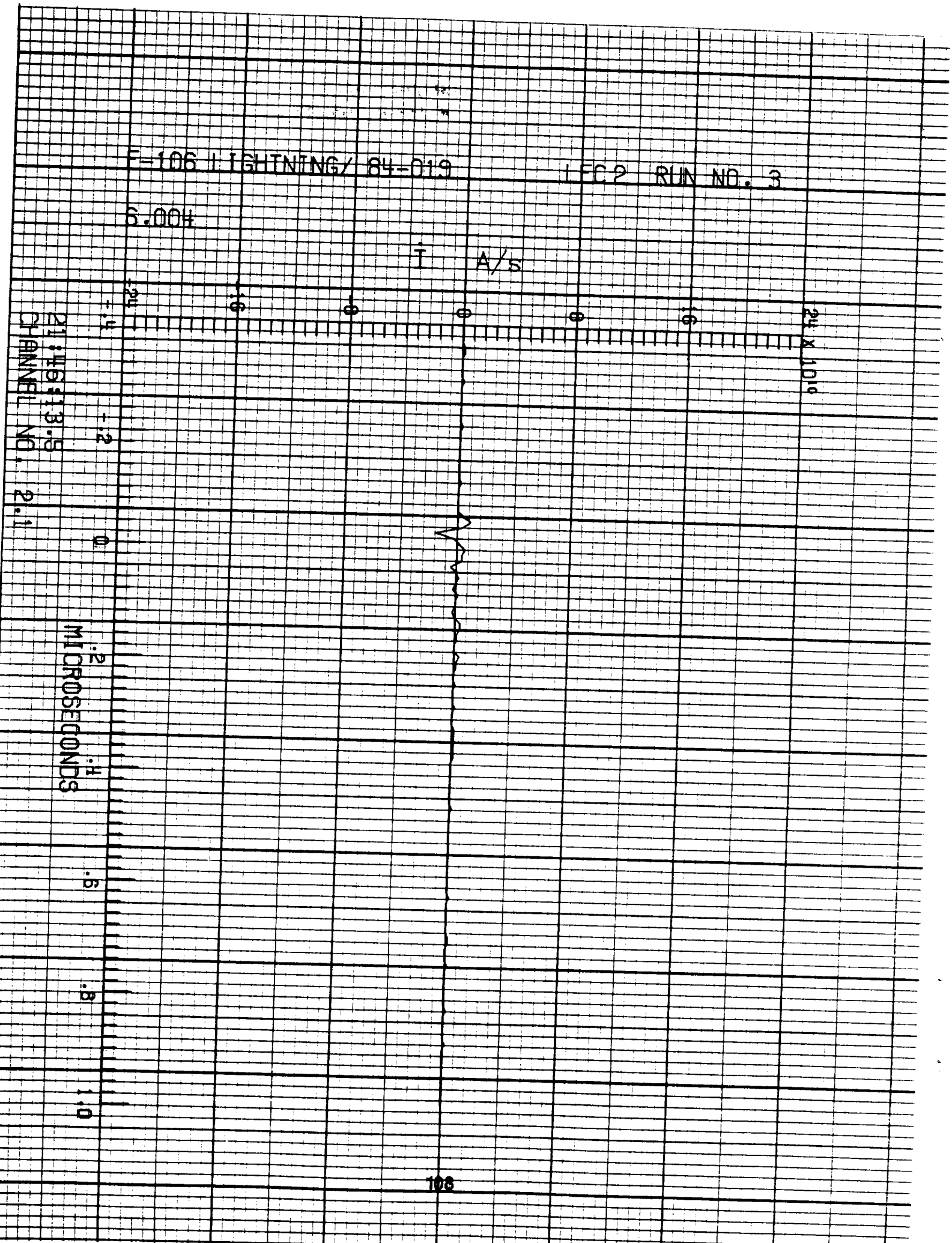
$\dot{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-1.4 -1.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:46:13.5
CHANNEL NO. 2.0


F-106 LIGHTNING/ 84-019
LEC2 RUN NO. 3
6.004
İ A/s
-24
-16
-8
0
8
16
24 x 10¹⁰
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:46:13.5
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

-106 LIGHTNING/ 84-019 LFC2 RUN NO. 3

6.00H

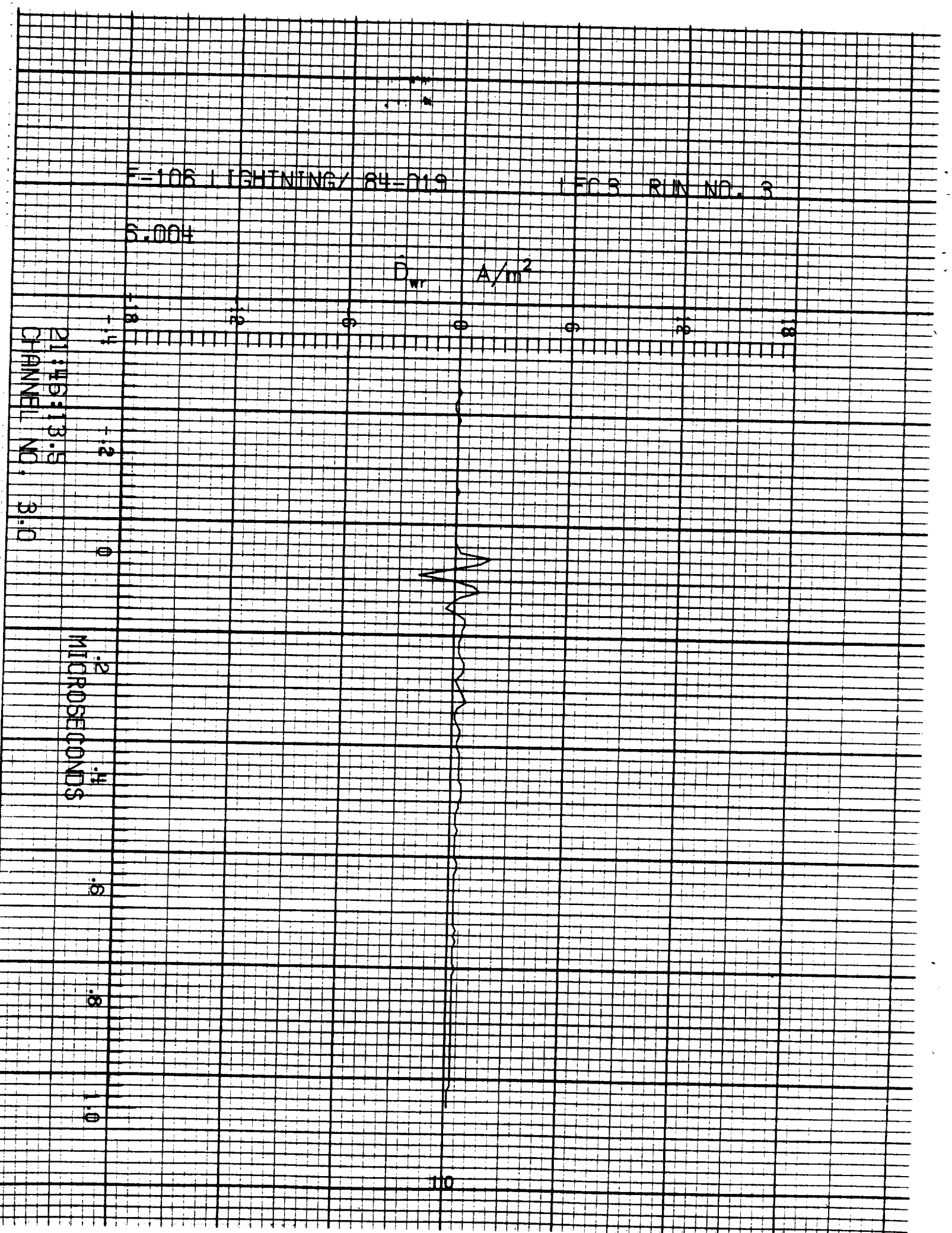
$\dot{B}_1$ T/S

-1000 -500 0 500 1000

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:46:13.5
CHANNEL NO. 2

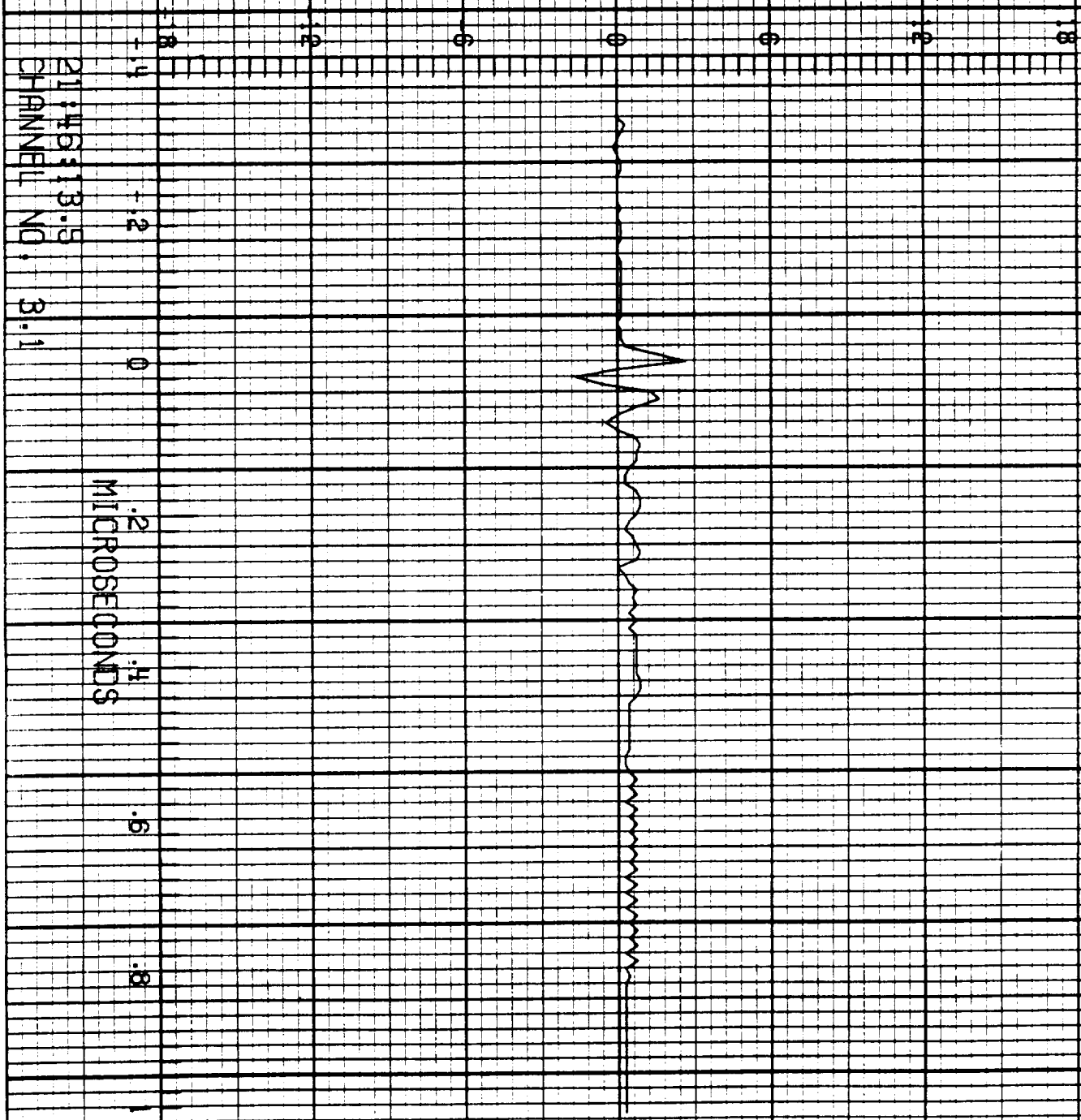

F-106 LIGHTNING/ 84-019
LEC 3 RUN NO. 3
6.004
$\hat{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:46:13.5
CHANNEL NO. 3.0
110

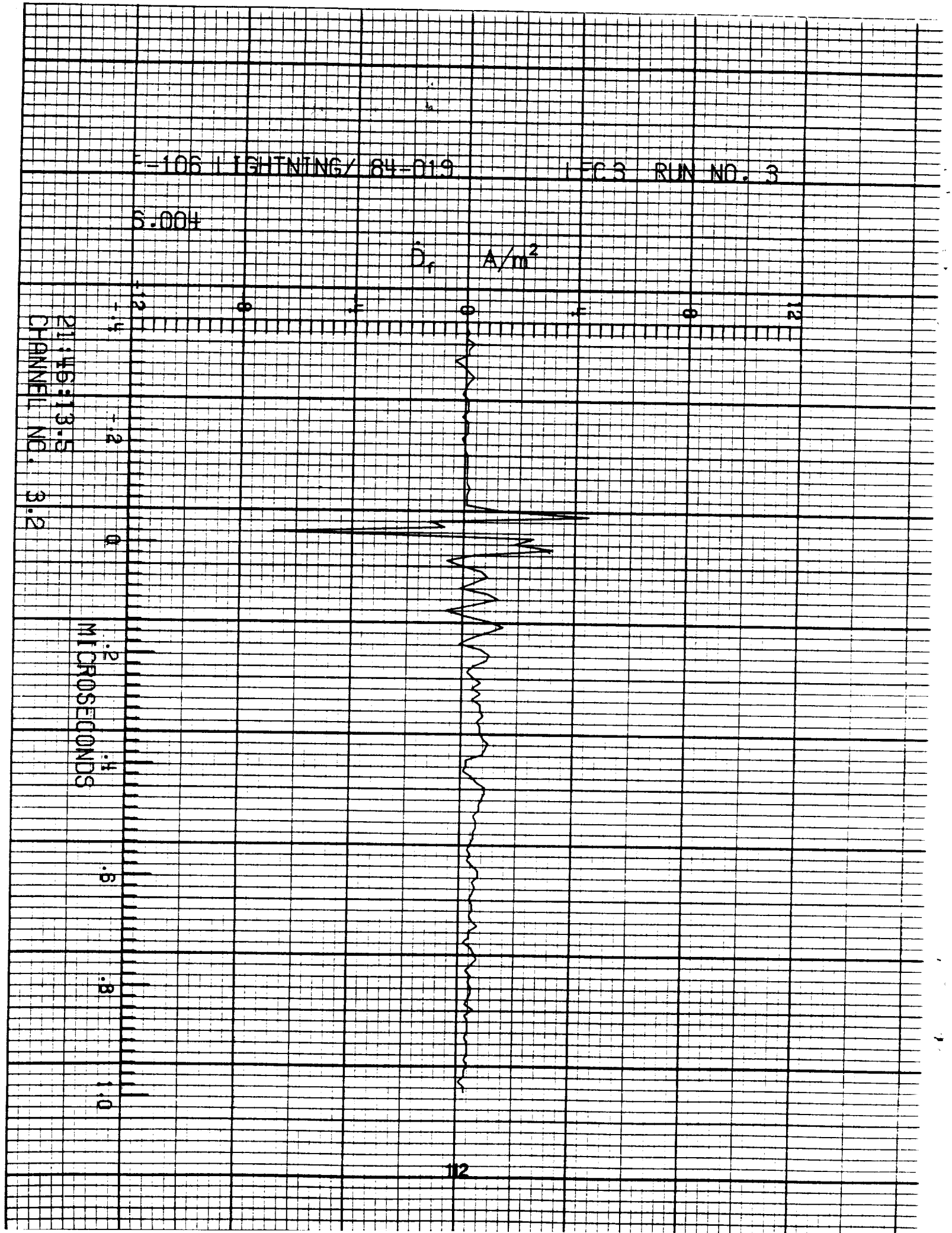
ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-019 FC3 RUN NO. 3

6.00H

$\dot{D}_{w1}$ A/m^2




F-106 LIGHTNING/ 84-019
LEC3 RUN NO. 3
6.004
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:46:13.5
CHANNEL NO. 3.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-019 LEC4 RUN NO. 3

5.004

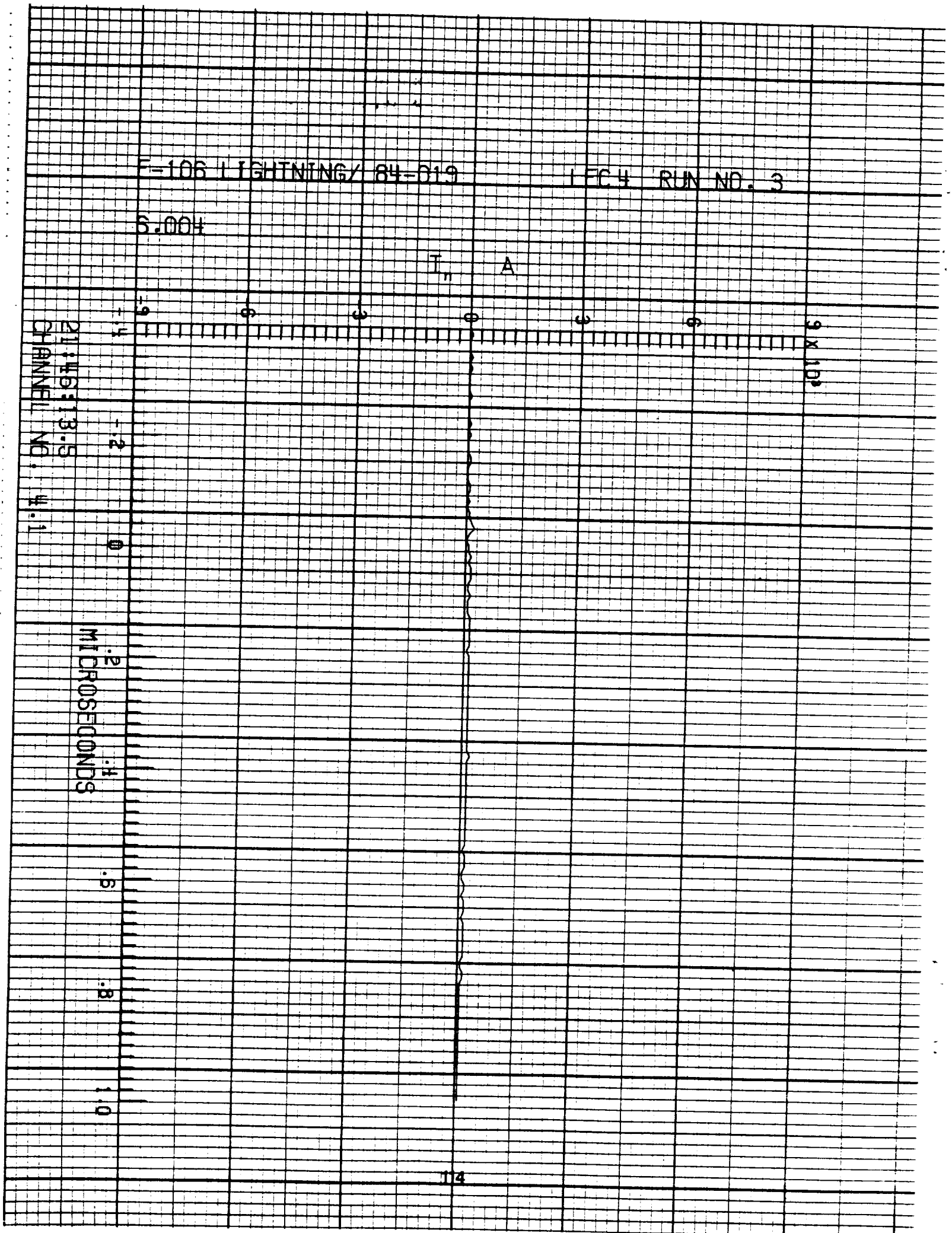
V_{fa} V

-80 -60 -40 -20 0 20 40 60

21:46:13.8
CHANNEL NO. 4.0

-1.4 -1.2 0 .2 .4 .6 .8 1.0

MICROSECONDS


F-106 LIGHTNING/ 84-019
LFC4 RUN NO. 3
6.004
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:46:13.5
CHANNEL NO. 4.1

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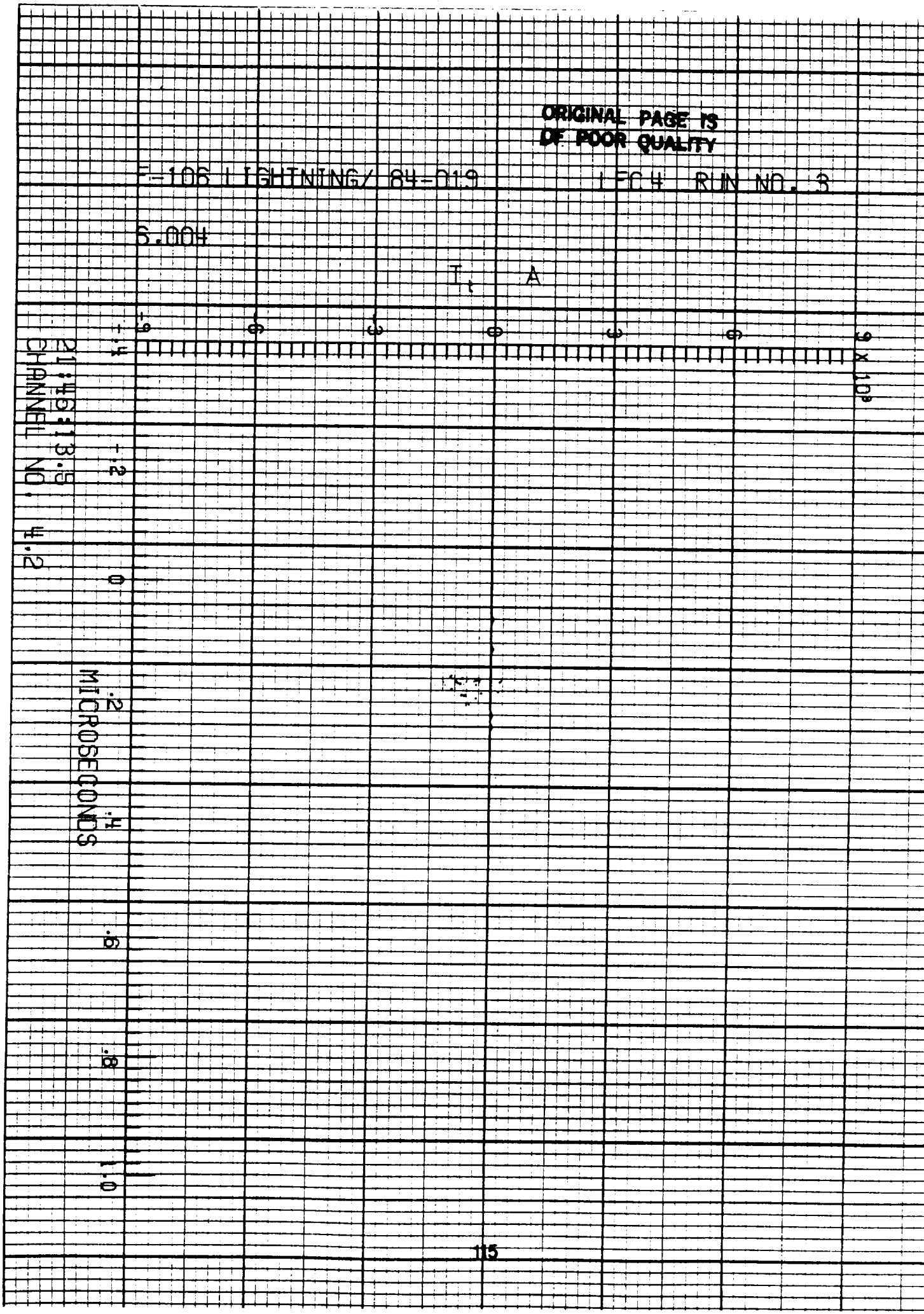
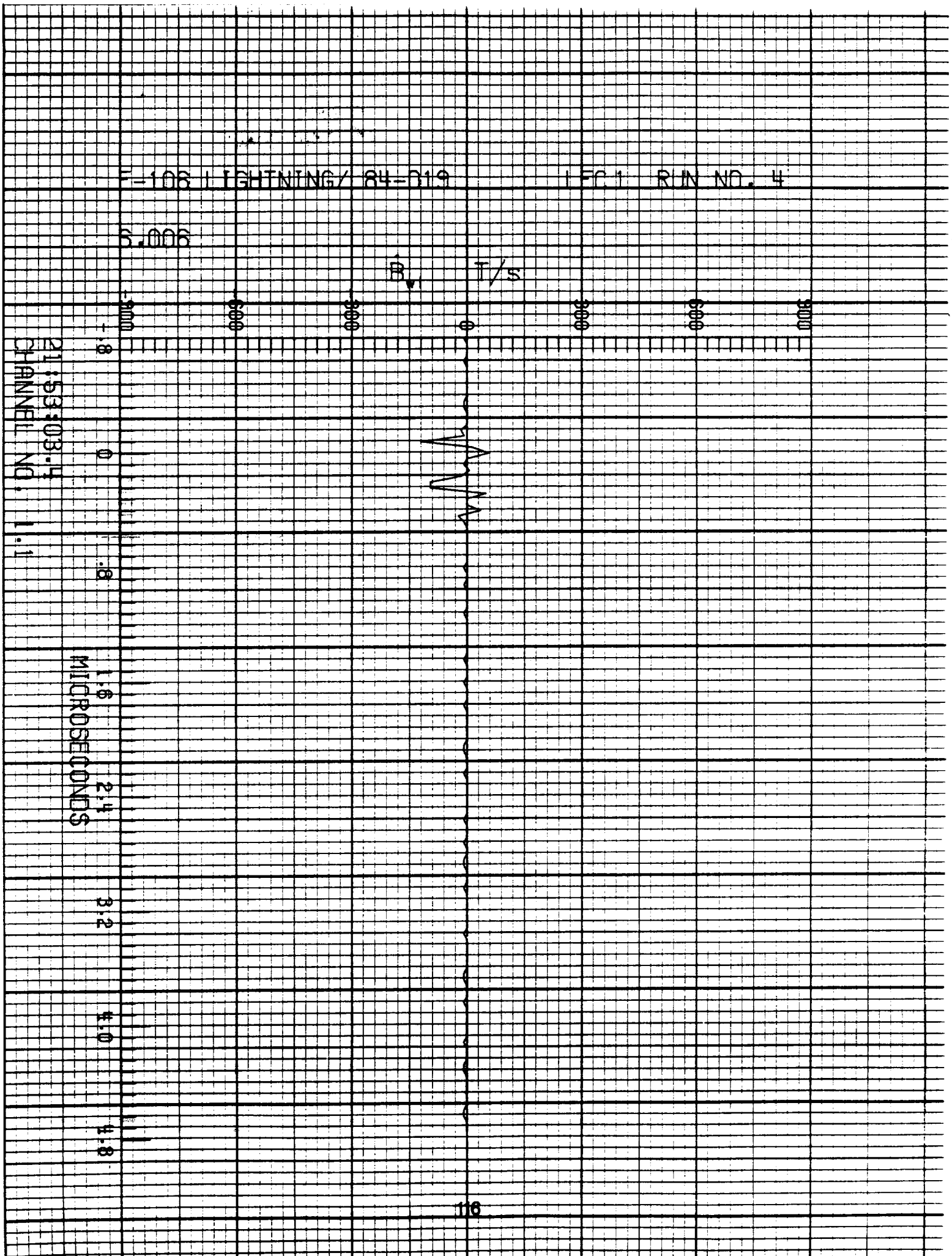



F-106 LIGHTNING/ 84-019
LFC1 RUN NO. 4
6.006
$\dot{B}_{w1}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
21:53:03.4
CHANNEL NO. 1.1

F-106 LIGHTNING/ 84-019 IFC 1 RUN NO. 4

6.006

$\dot{B}_{wr}$ T/S

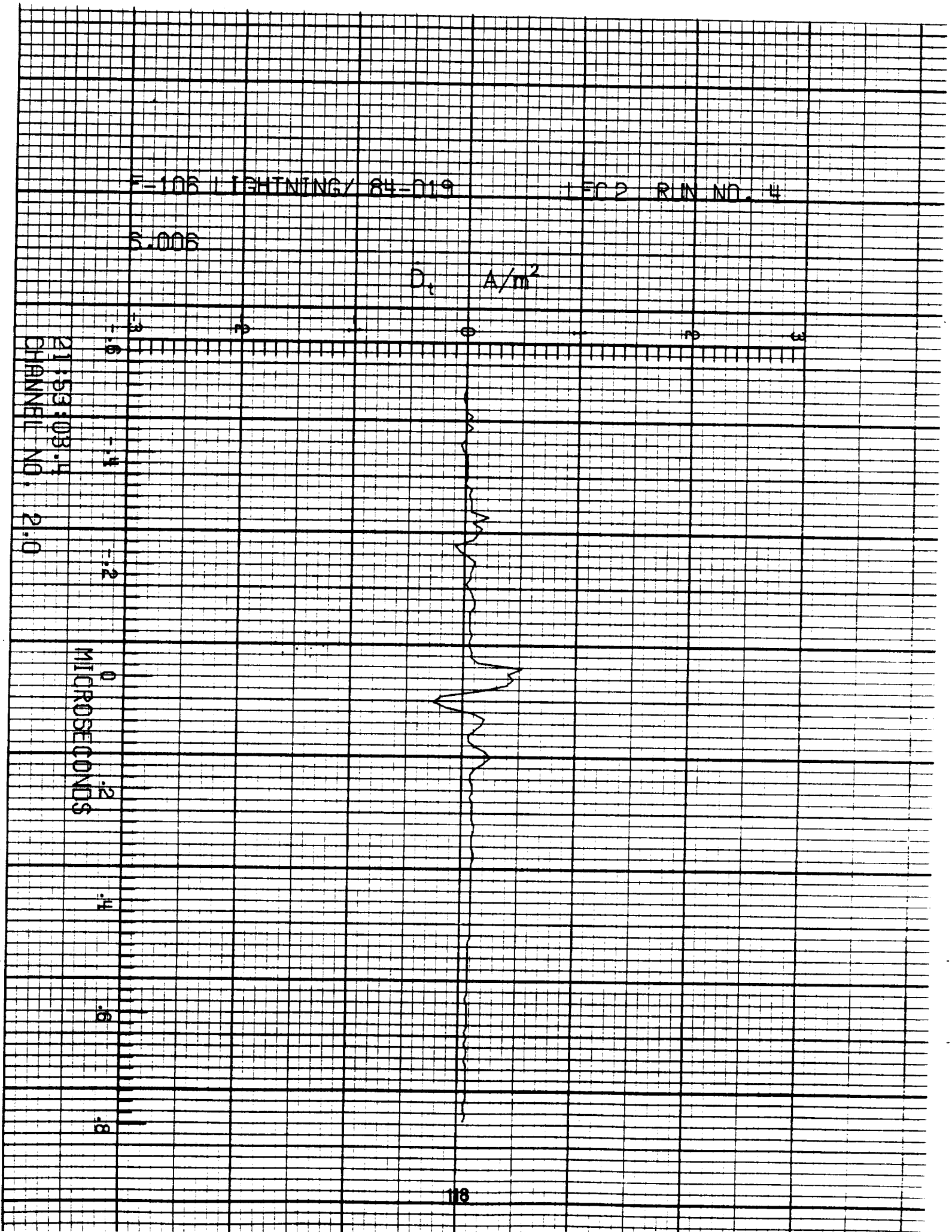
-800 -600 -400 -200 0 200 400 600 800

-.8 0 .8

21:53:03.5
CHANNEL NO. 1.2

1.6 2.4 3.2 4.0 4.8

MICROSECONDS


F-106 LIGHTNING/ 84-019
LEC 2 RUN NO. 4
6.006
$\dot{D}_t$ A/m^2
21:53:03.4
CHANNEL NO. 2.0
MICROSECONDS
-.6
-.4
-.2
0
.2
.4
.6
.8

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F-106 LIGHTNING/ 84-019 IFC 2 RUN NO. 4

5.000

$\dot{I}$ A/S

24 16 8 0 8 16 24 x 10^{12}

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

21:53:03.4
CHANNEL NO. 2:1

-106 LIGHTNING/ 84-019
ICP RUN NO. 4
6.006
$\dot{B}$, T/s
-800
-600
-400
-200
0
200
400
600
800
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
21:53:03.H
CHANNEL NO. 2.2

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F-106 LIGHTNING/ 84-019 IEC 3 RUN NO. 4

6.006

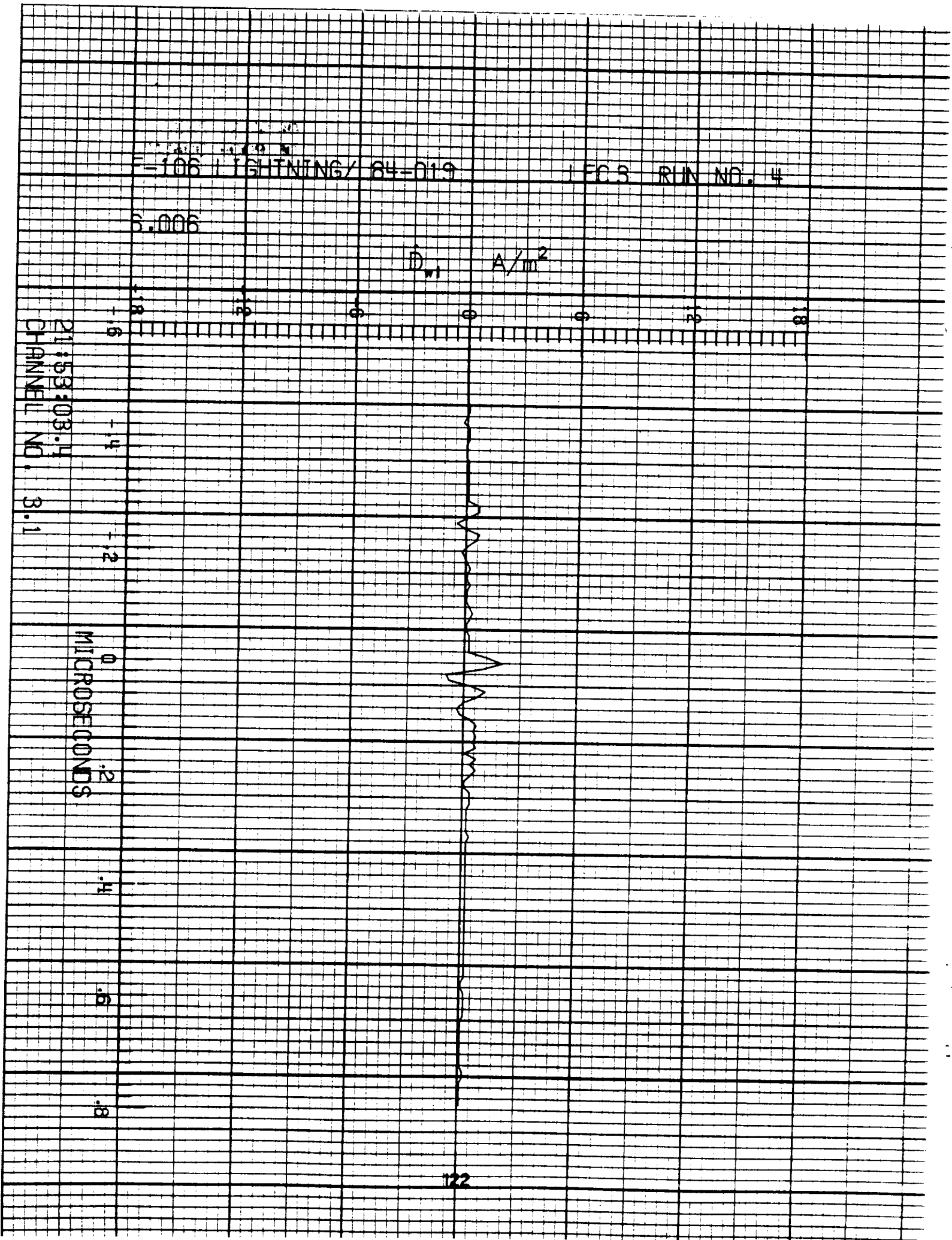
$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

21:53:03.H
CHANNEL NO. 3.D


F-106 LIGHTNING/ 84-019
LEC3 RUN NO. 4
6.006
$\dot{D}_{wl}$ A/m^2
-18
-12
-6
0
6
12
18
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
21:53:03.4
CHANNEL NO. 3.1

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F-106 LIGHTNING/ 84-019 LFOR RUN NO. 4

6.006

D_t A/m^2

-1.2 -.8 -.4 0 .4 .8 1.2

-1.2 -.8 -.4 0 .4 .8 1.2

MICROSECONDS

21:53:03.5
CHANNEL NO. 8.2

F-106 LIGHTNING/ 84-019 IFC 4 RUN NO. 4

6.006

V_{fa} V

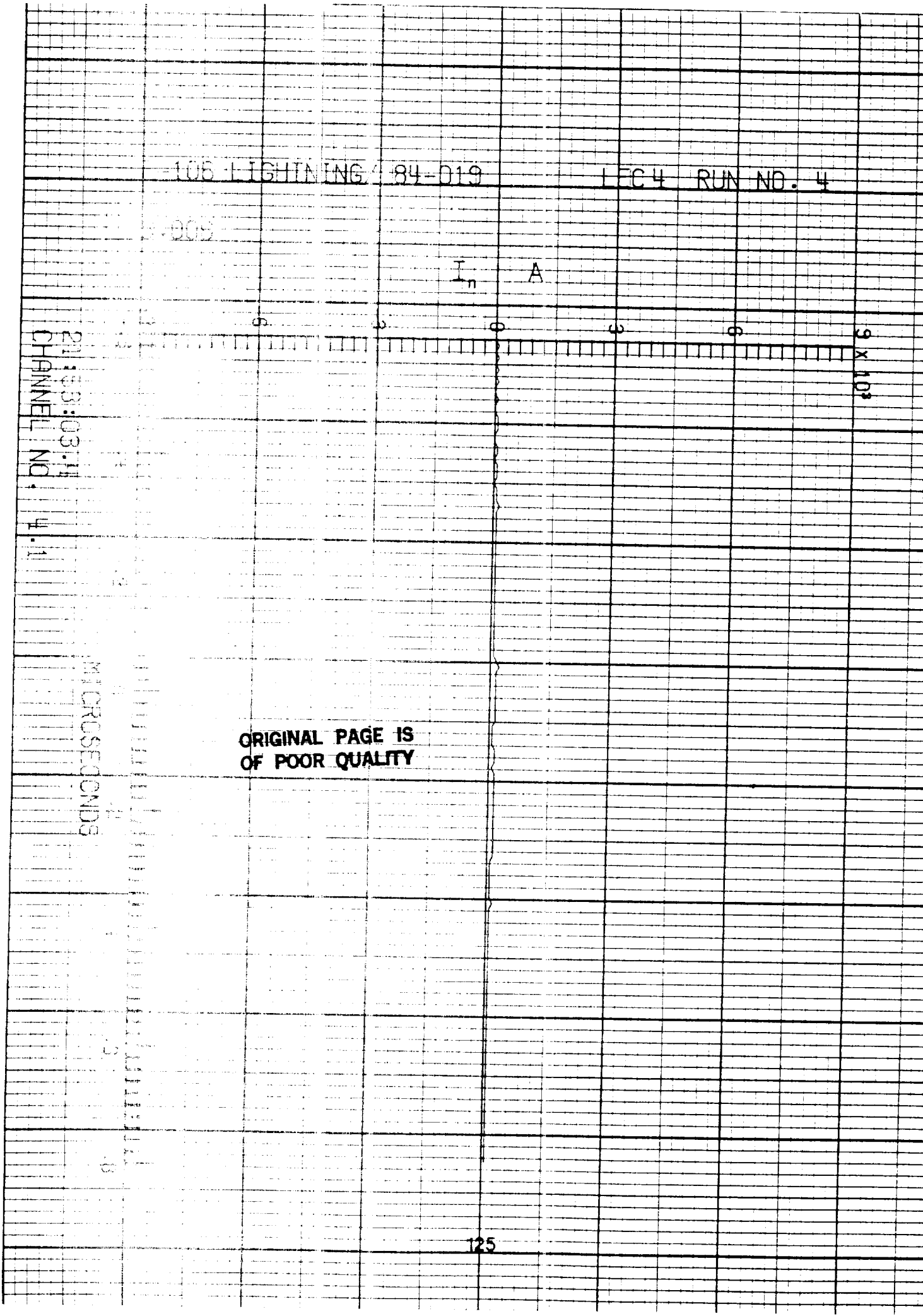
-60 -40 -20 0 20 40 60

-.6 -.4 -.2 0 .2 .4 .6 .8

21:56:08.8

CHANNEL NO. #10

MICROSECONDS



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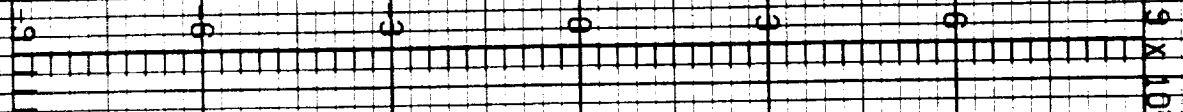
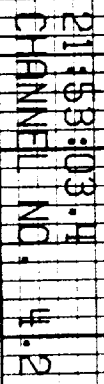
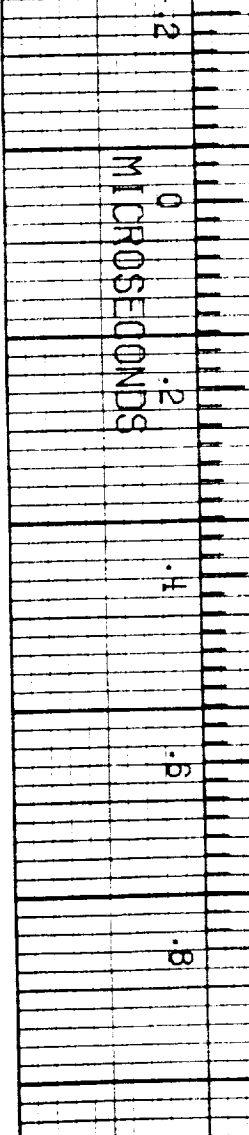
F-106 LIGHTNING/ 84-019 LEC4 RUN NO. 4

6.006

I_t A







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F-106 LIGHTNING/ 84-019 LEC 1 RUN NO. 5

6.007

$\dot{B}_{w1}$ T/s

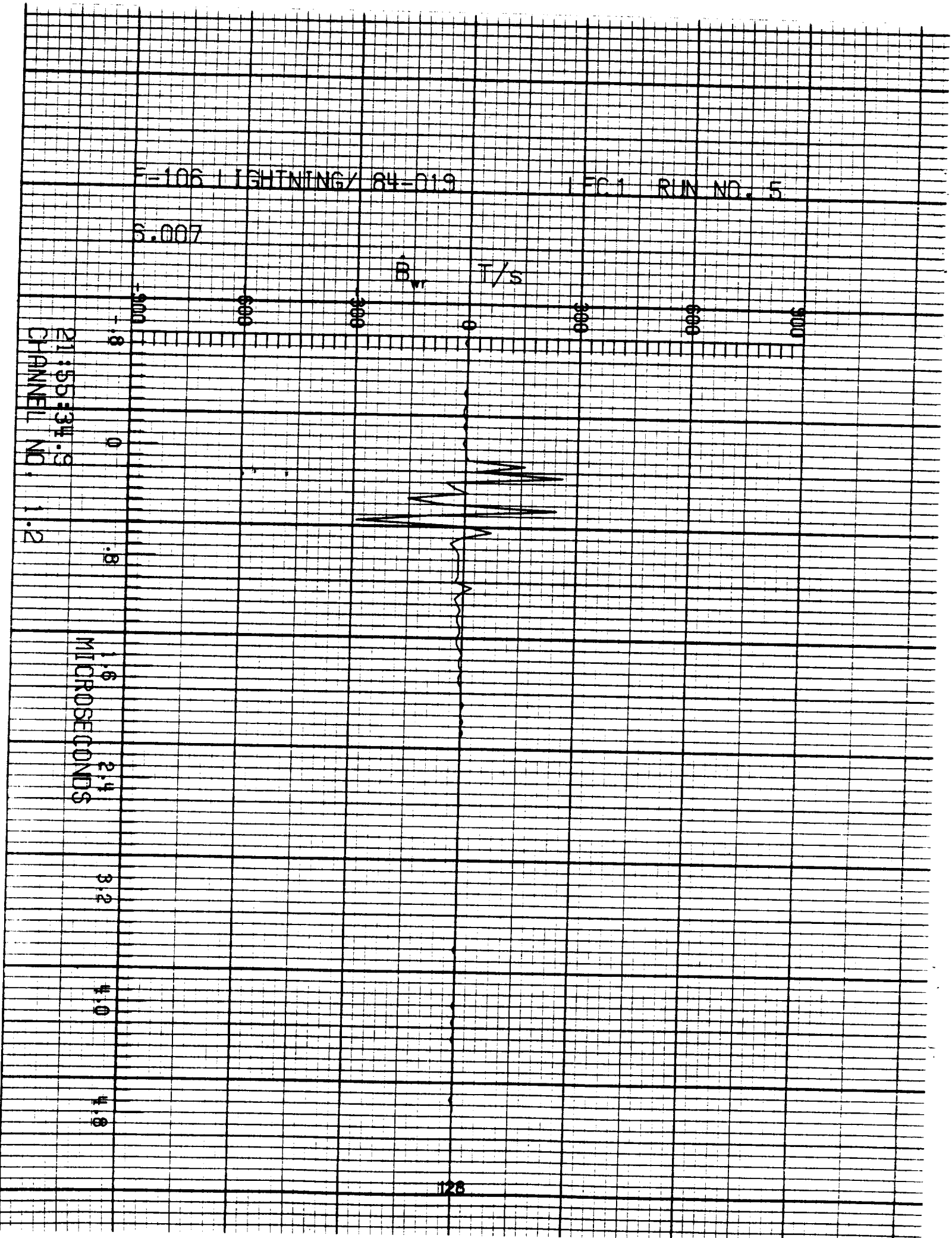
-900 -600 -300 0 300 600 900

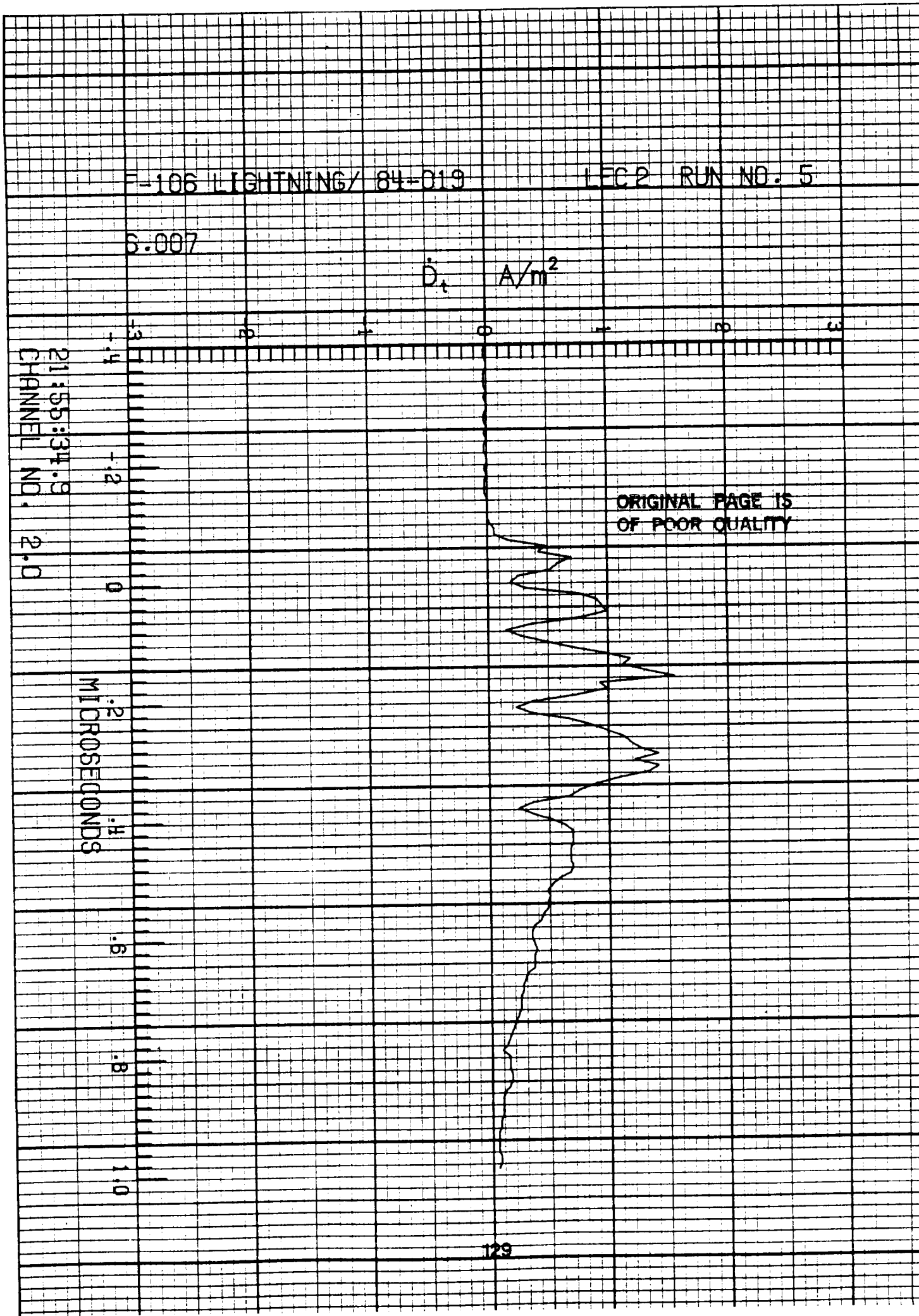
CHANNEL NO. 1 21:55:34.9

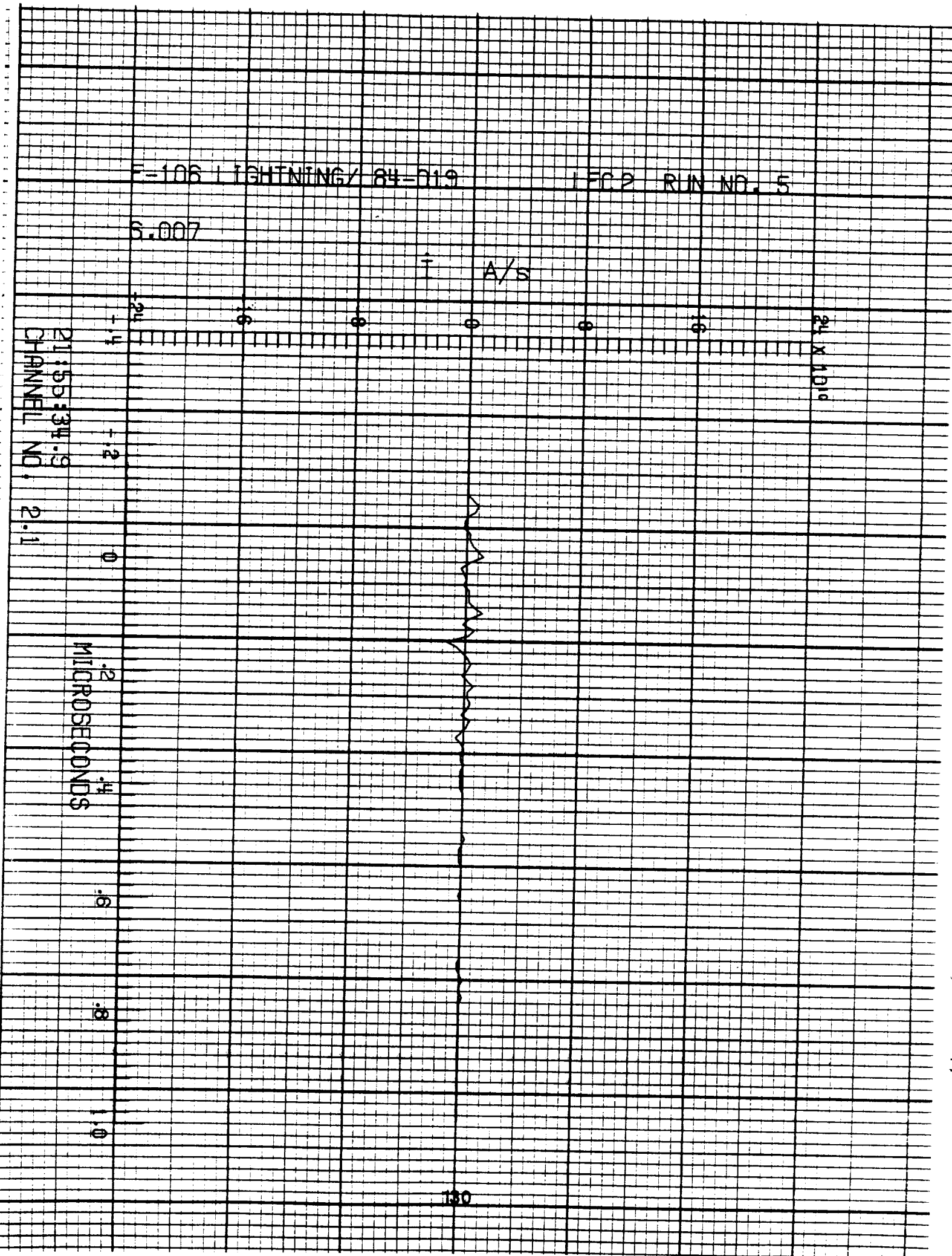
1.1 .8 0 .8 1.6 2.4 3.2 4.0 4.8

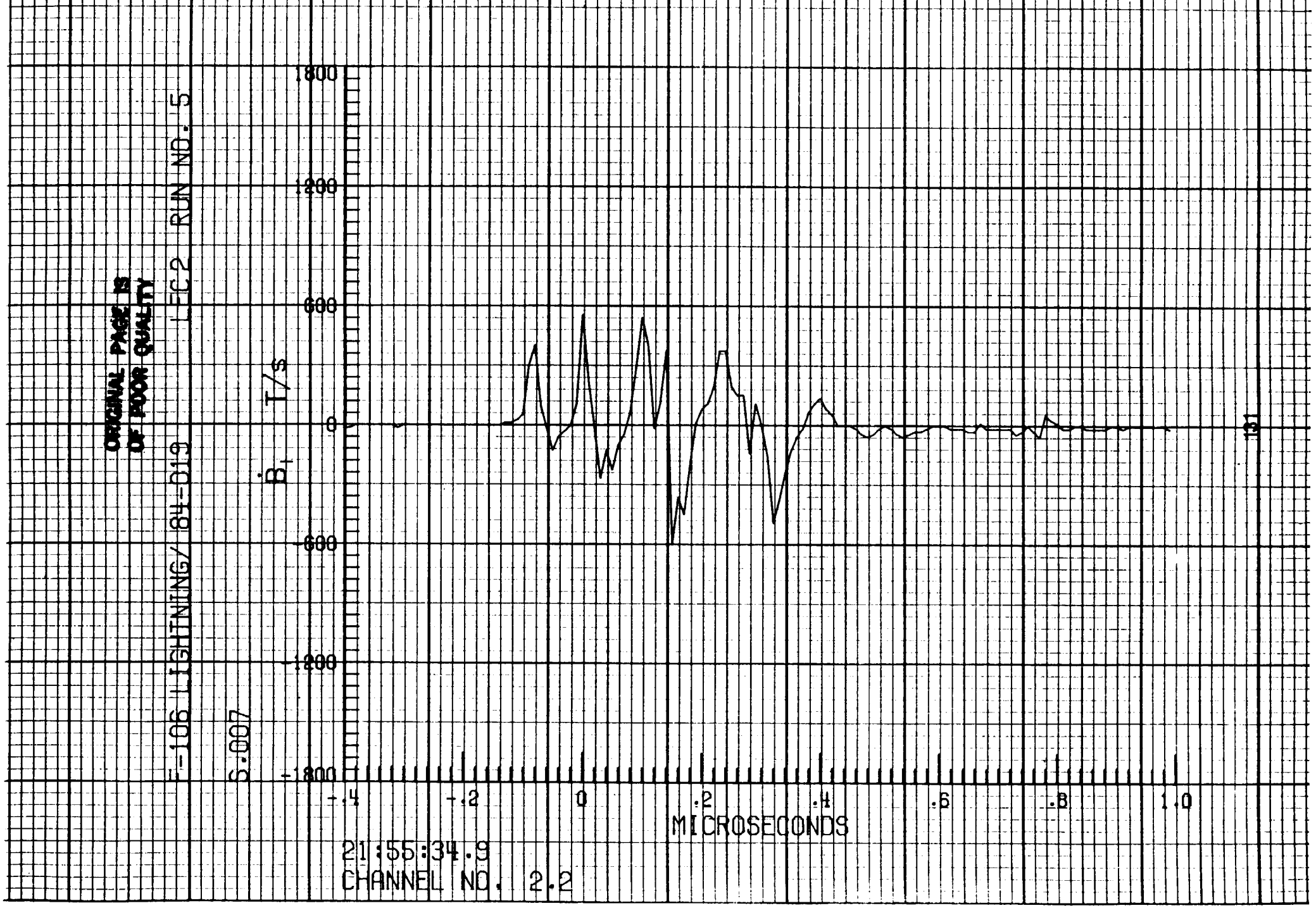
MICROSECONDS

ORIGINAL PAGE IS
OF POOR QUALITY


F-106 LIGHTNING/ 84-019
LFC1 RUN NO. 5
6.007
$\dot{B}_{wr}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
21:55:34.9
CHANNEL NO. 1.2


F-106 LIGHTNING/ 84-019
LEC 2 RUN NO. 5
6.007
$\dot{D}_t$ A/m^2
-3
-2
-1
0
1
2
3
21:55:34.8
CHANNEL NO. 2.0
-14
-12
0
2.0
MICROSECONDS
.4
.6
.8
1.0
ORIGINAL PAGE IS
OF POOR QUALITY


F-106 LIGHTNING/ 84-019
LFC2 RUN NO. 5
6.007
Î A/s
-24
-16
-8
0
8
16
24 x 10¹⁰
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:55:34.9
CHANNEL NO. 2.1


ORIGINAL PAGE IS
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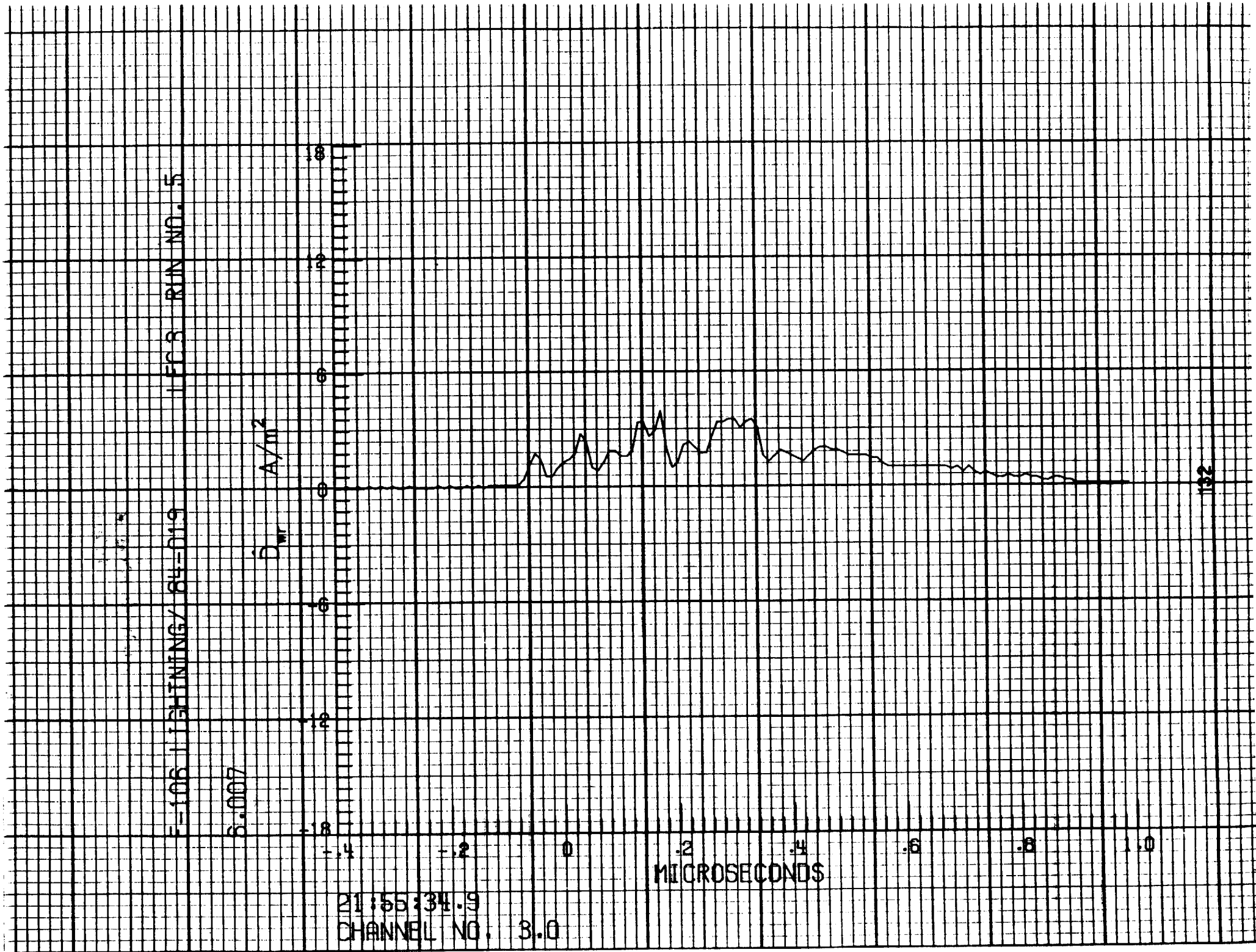
F=106 LIGHTNING/ 84-019 FC2 RUN NO. 5
S:007
$B_\perp$ T/s
1800
1200
600
0
-600
-1200
-1800
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:55:34.9
CHANNEL NO. 2.2


F=106 LIGHTNING/ 84=219 +FC8 RUN NO. 5
6.007
A/m2
18
12
6
0
-6
-12
-18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:55:34.9
CHANNEL NO. 3.0

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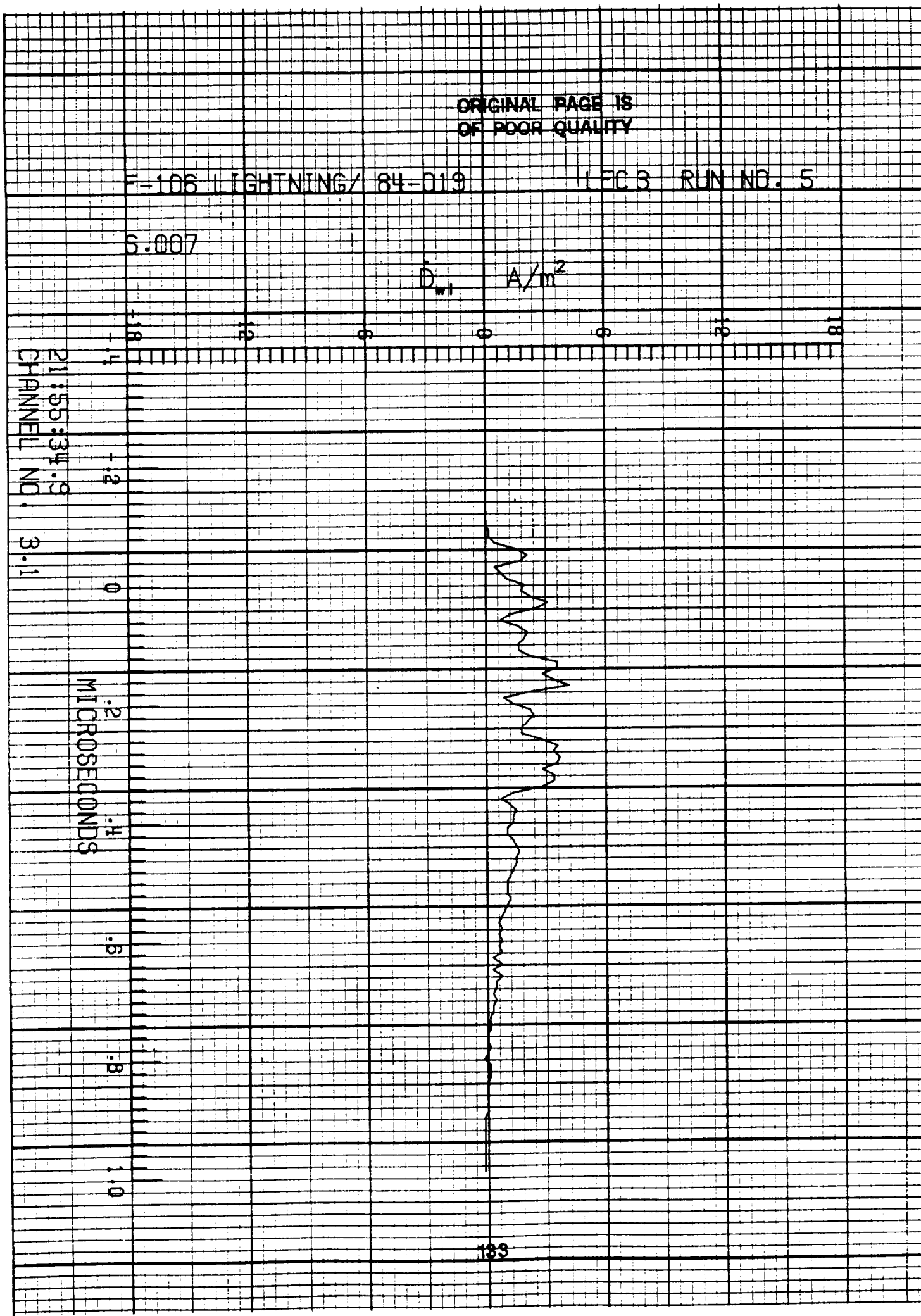

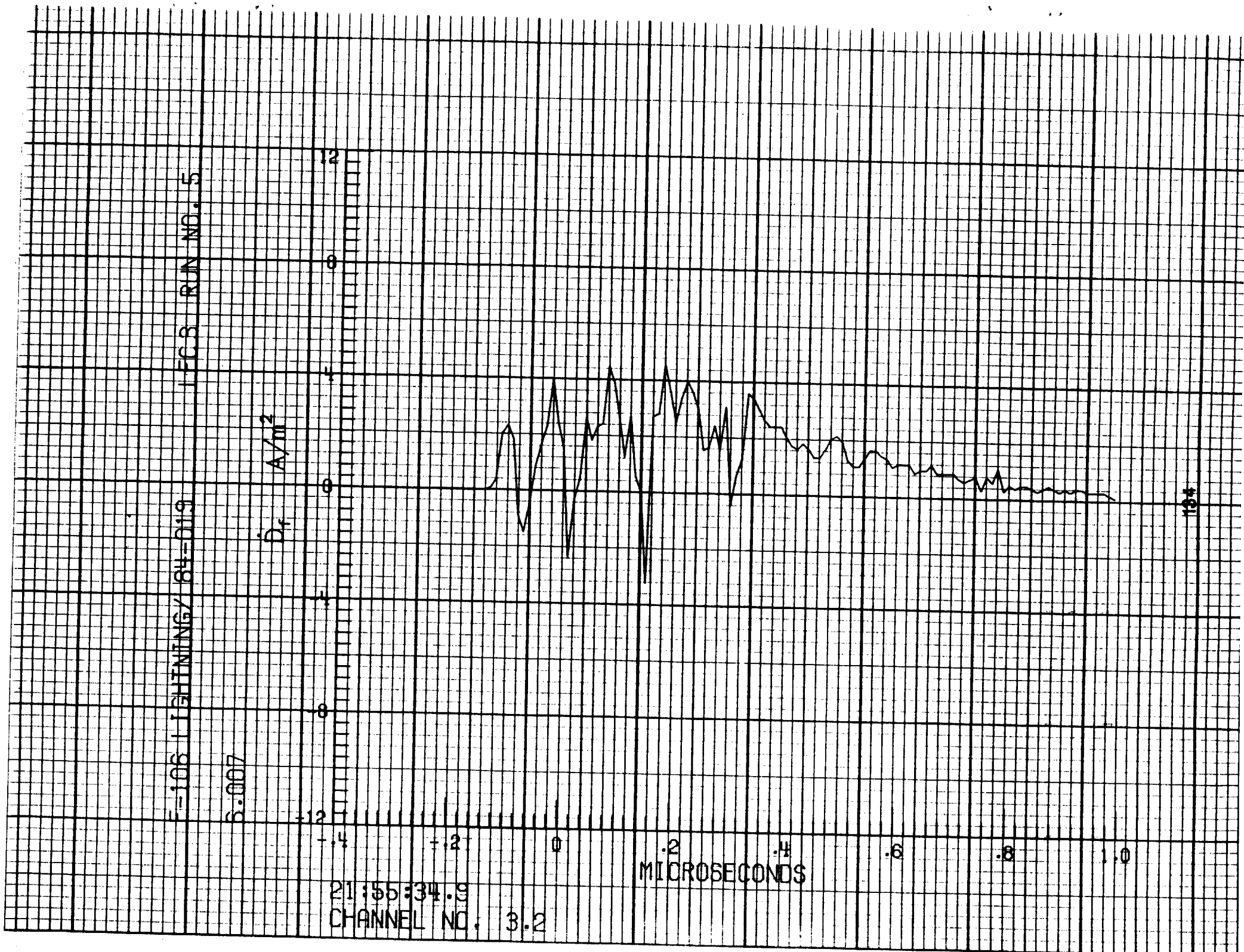
F-106 LIGHTNING/ 84-019 FC-3 RUN NO. 5
6.007
D_t A/m2
12
8
4
0
-4
-8
-12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:55:34.9
CHANNEL NO. 3.2

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F-106 LIGHTNING/ 84-019 LEC4 RUN NO. 5

6.007

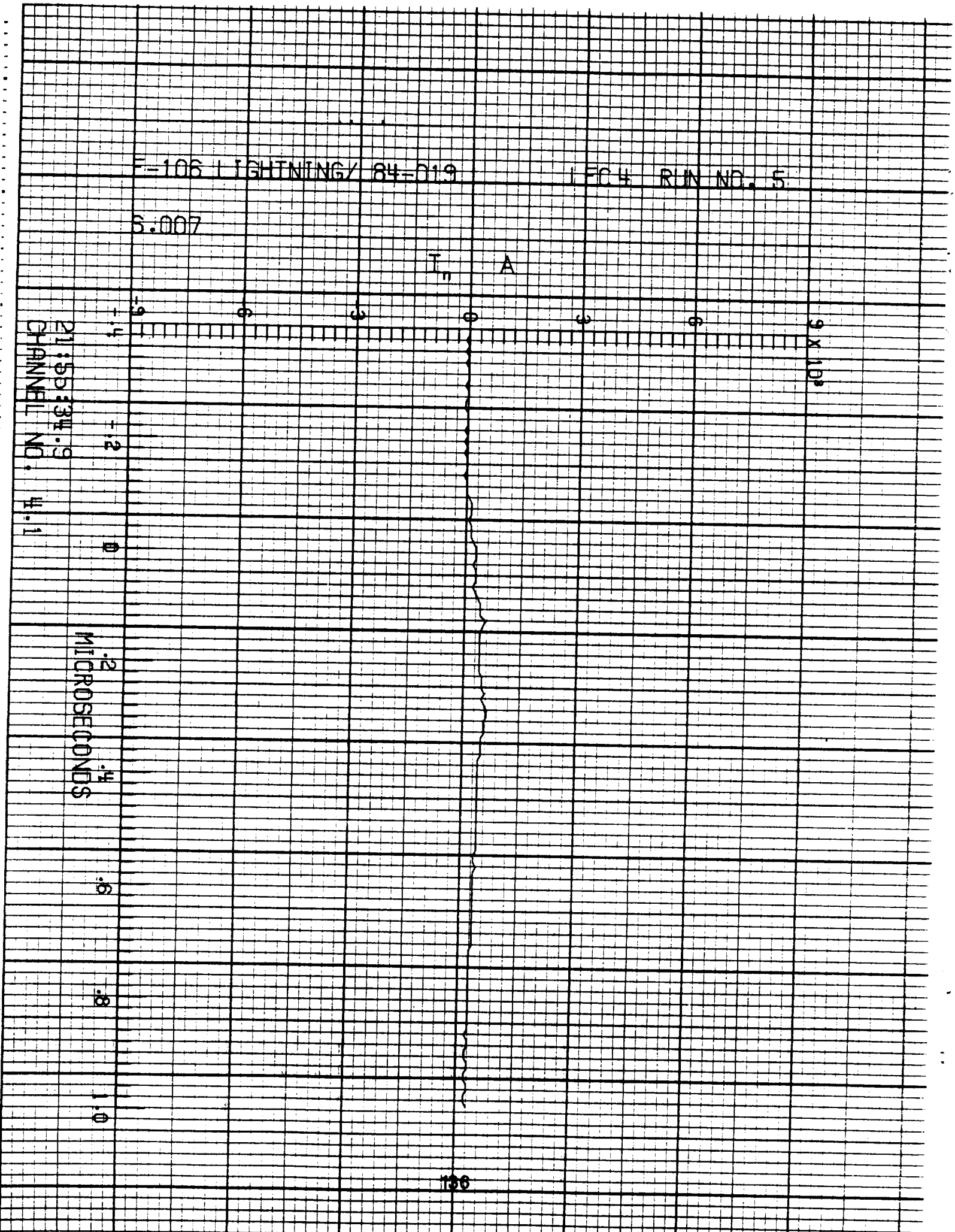
V_{fa} V

-80 -60 -40 -20 0 20 40 60

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

21:55:34.9
CHANNEL NO. 4.0


F-106 LIGHTNING/ 84-019
LFC4 RUN NO. 5
S.007
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
21:55:34.9
CHANNEL NO. 4.1

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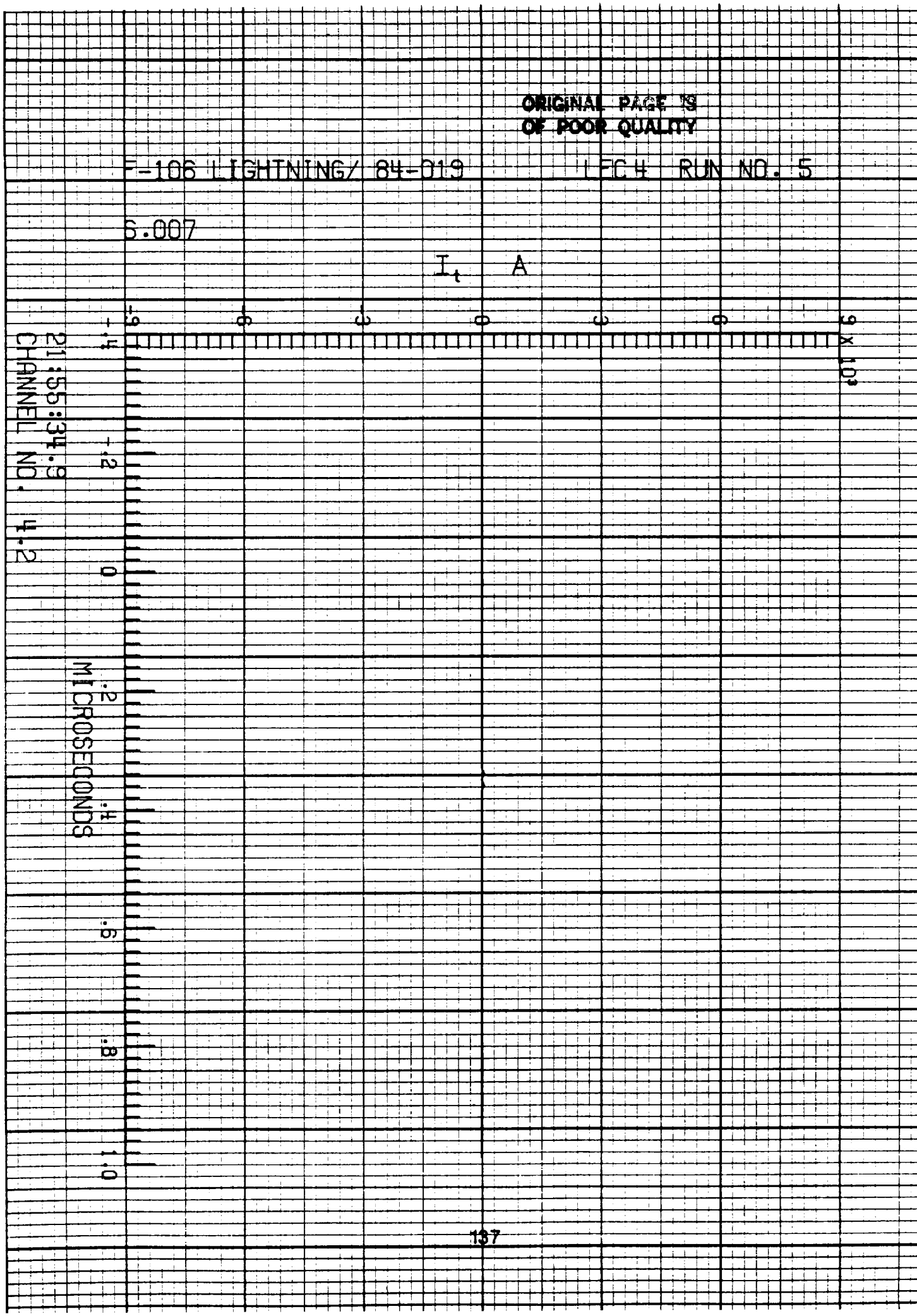

F-106 LIGHTNING/ 84-019 LEC 1 RUN NO. 6

S.003

$\dot{B}_{w1}$ T/s

+900 600 300 0 300 600 900

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

22:00:05.6
CHANNEL NO. 1.1

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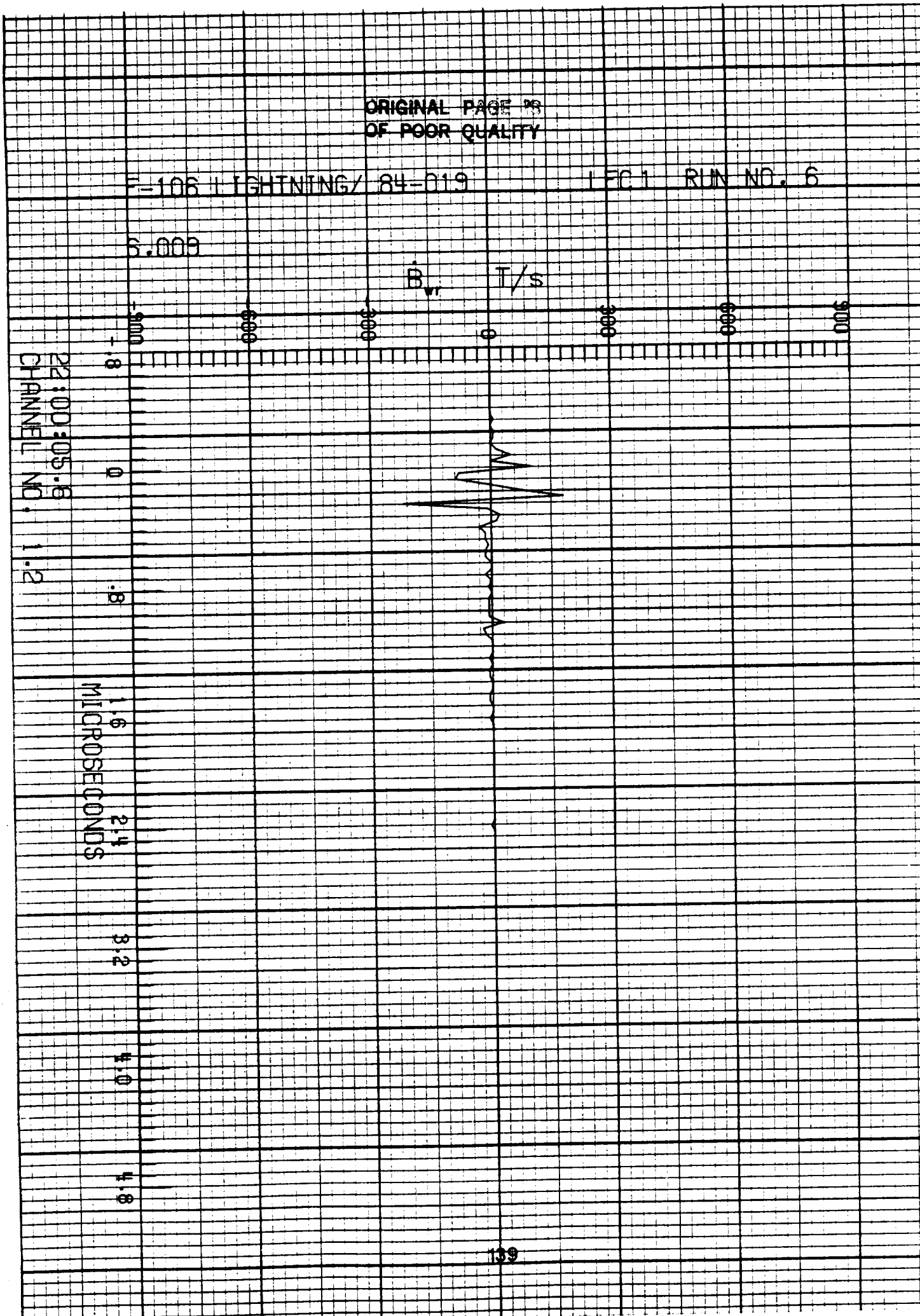
F-106 LIGHTNING/ 84-019 LFC 1 RUN NO. 6



F-106 LIGHTNING/ 84-019 LEC 2 RUN NO. 6

5.008

$\dot{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

CHANNEL NO. 2 22:00:05.8

2.0 0 -.2 -.4 -.6 -.8 -1.0

MICROSECONDS

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F-106 LIGHTNING/ 84-019 LFC 2 RUN NO. 6

6.009

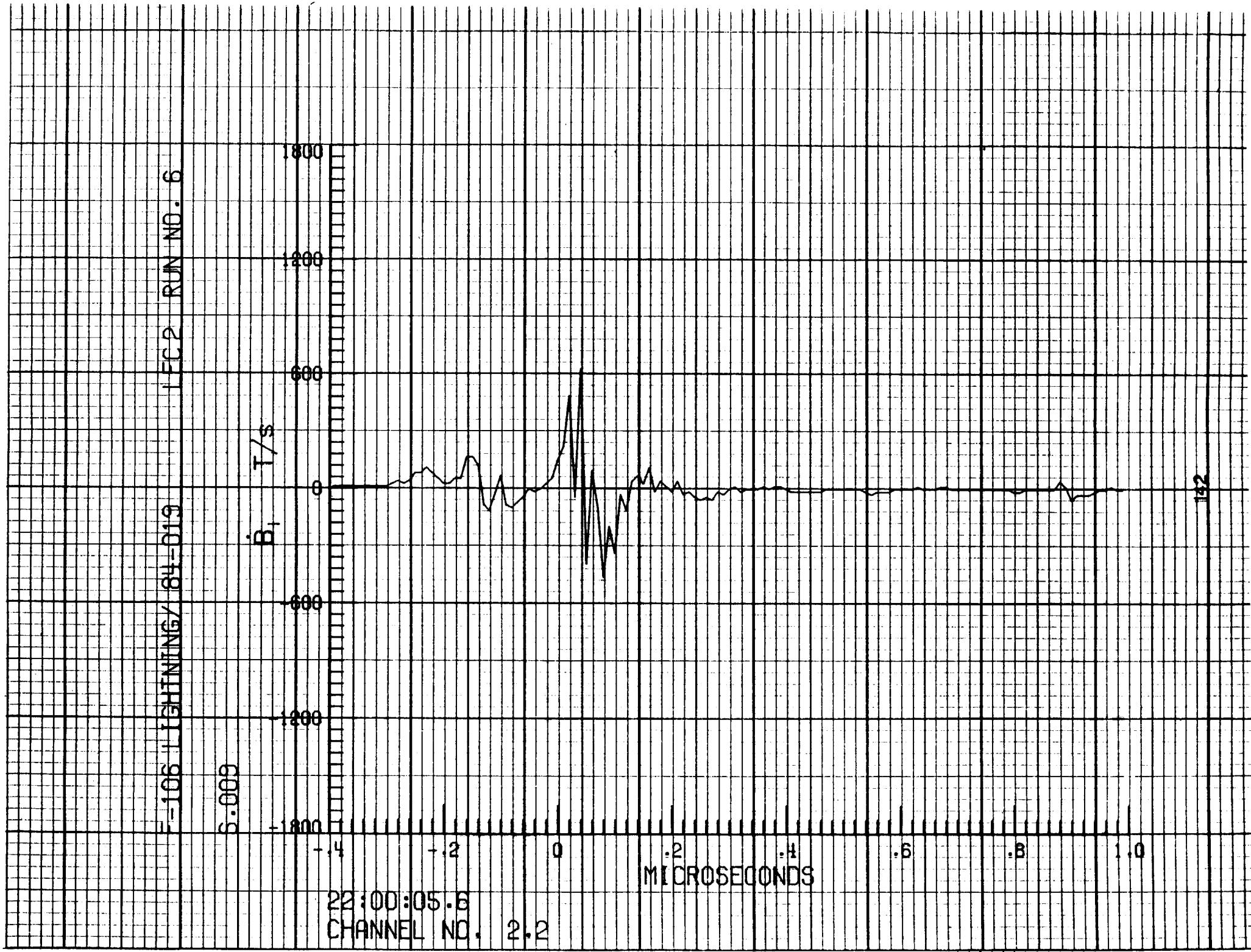
$\dot{I}$ A/s

+24 +16 +8 0 -8 -16 -24 x 10^{10}

22:00:05.8
CHANNEL NO. 2.1

+.4 +.2 0 -.2 -.4

.2 .4 .6 .8 1.0
MICROSECONDS


F-106 LIGHTNING 84-013 FC2 RUN NO. 6
S.009
1800
1200
600
0
-600
-1200
-1800
$\dot{B}_t$ T/S
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
22:00:05.6
CHANNEL NO. 2.2
142

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-019 IFCS RUN NO. 6

6.009

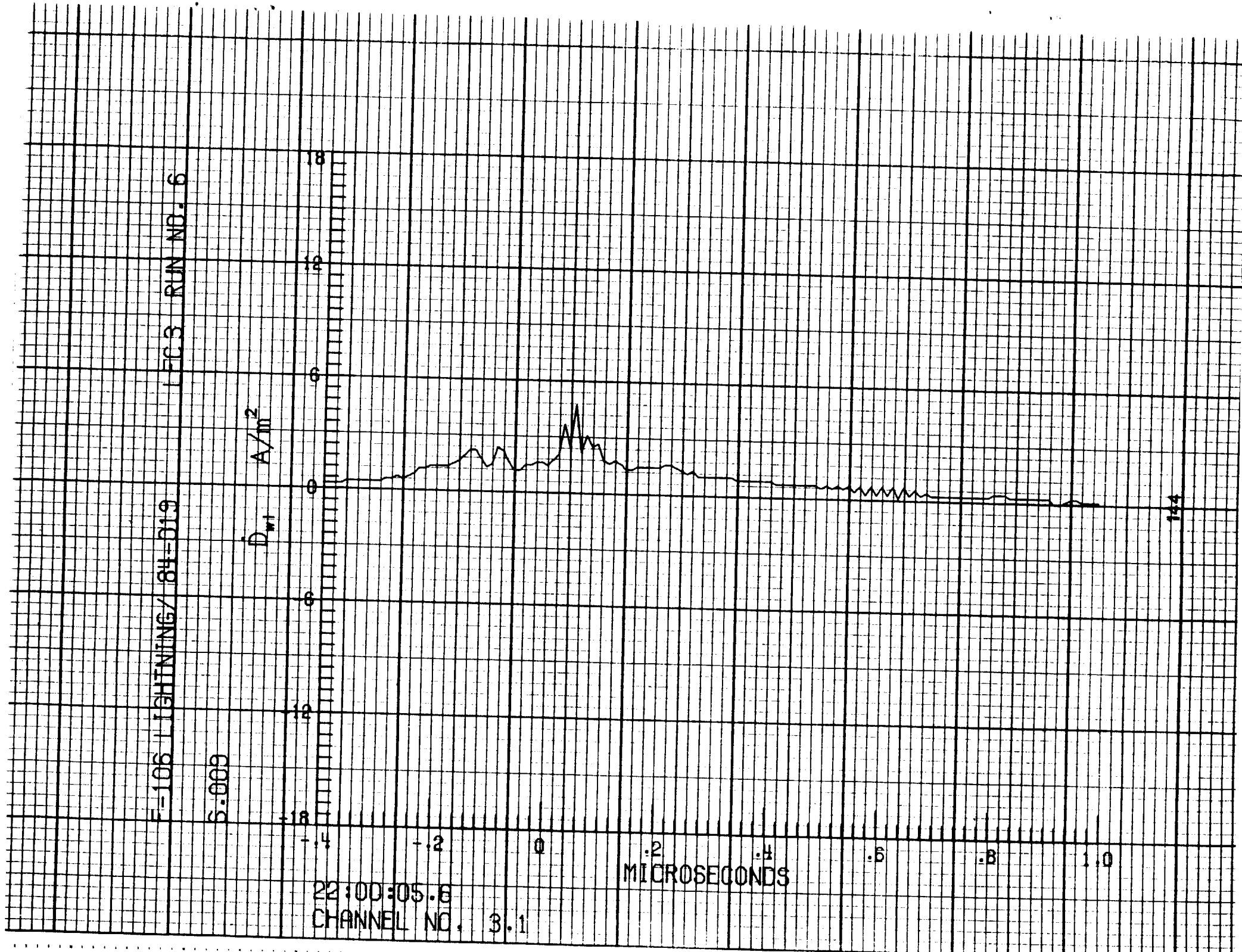
$\dot{D}_{wr}$ A/m^2

+18 +12 +6 0 -6 -12 -18

+1.4 +1.2 0 -.2 -.4 -.6 -.8 -1.0

22:00:05.6
CHANNEL NO. 3.0

MICROSECONDS


F-106 LIGHTNING/ 84-019 LFC.3 RUN NO. 6
6.009
D_{w1} A/m^2
18
12
6
0
-6
-12
-18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
22:00:05.6
CHANNEL NO. 3.1
144

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-019 IFC 3 RUN NO. 6

6.009

$\dot{D}_f$ A/m^2

+12 8 4 0 4 8 12

+.4 +.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

22:00:05.6
CHANNEL NO. 3.2

F-106 LIGHTNING/ 84-019 IFC4 RUN NO. 6

6.009

V_{fa} V

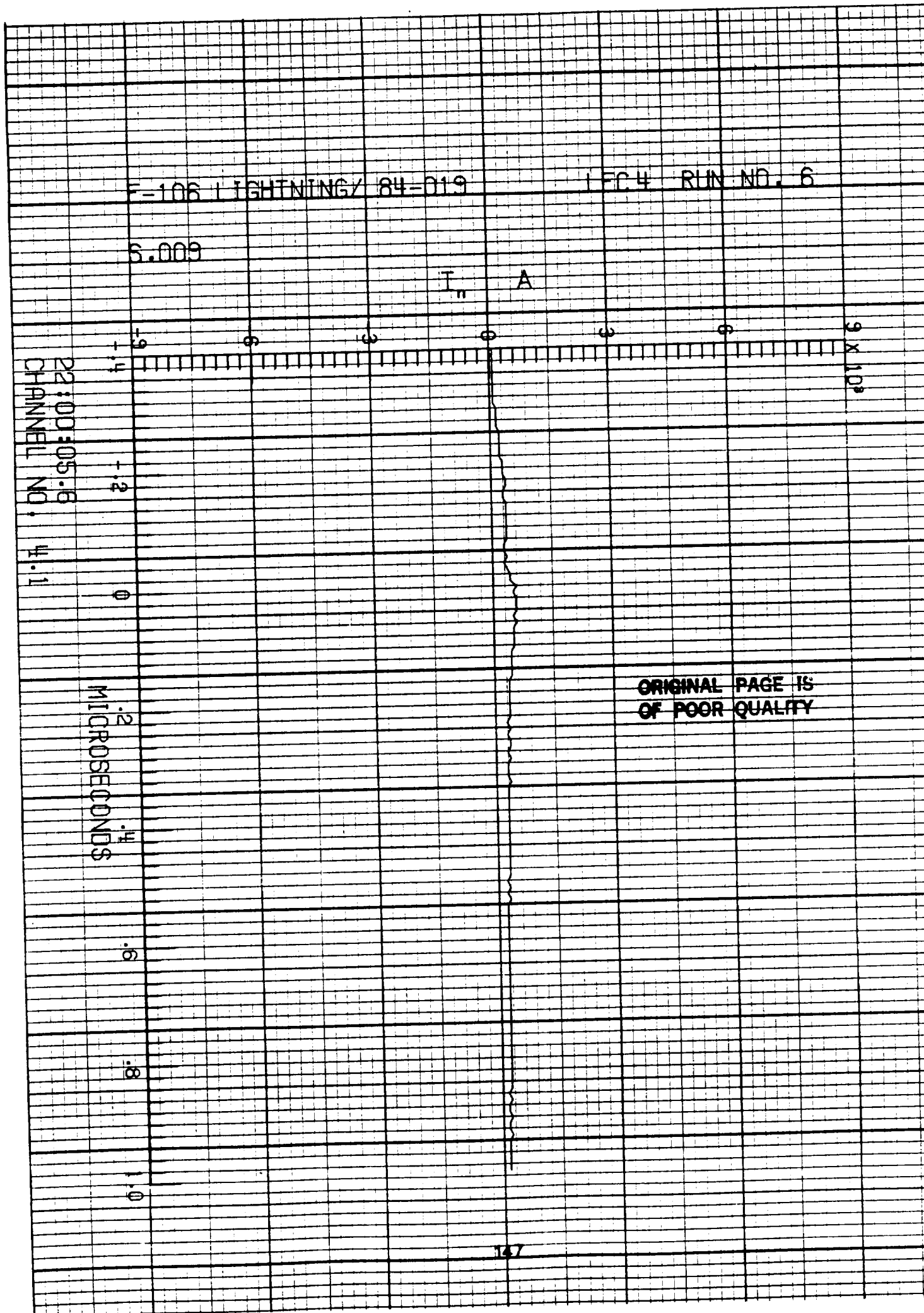
-60 -40 -20 0 20 40 60

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

22:00:05.6

CHANNEL NO. 4



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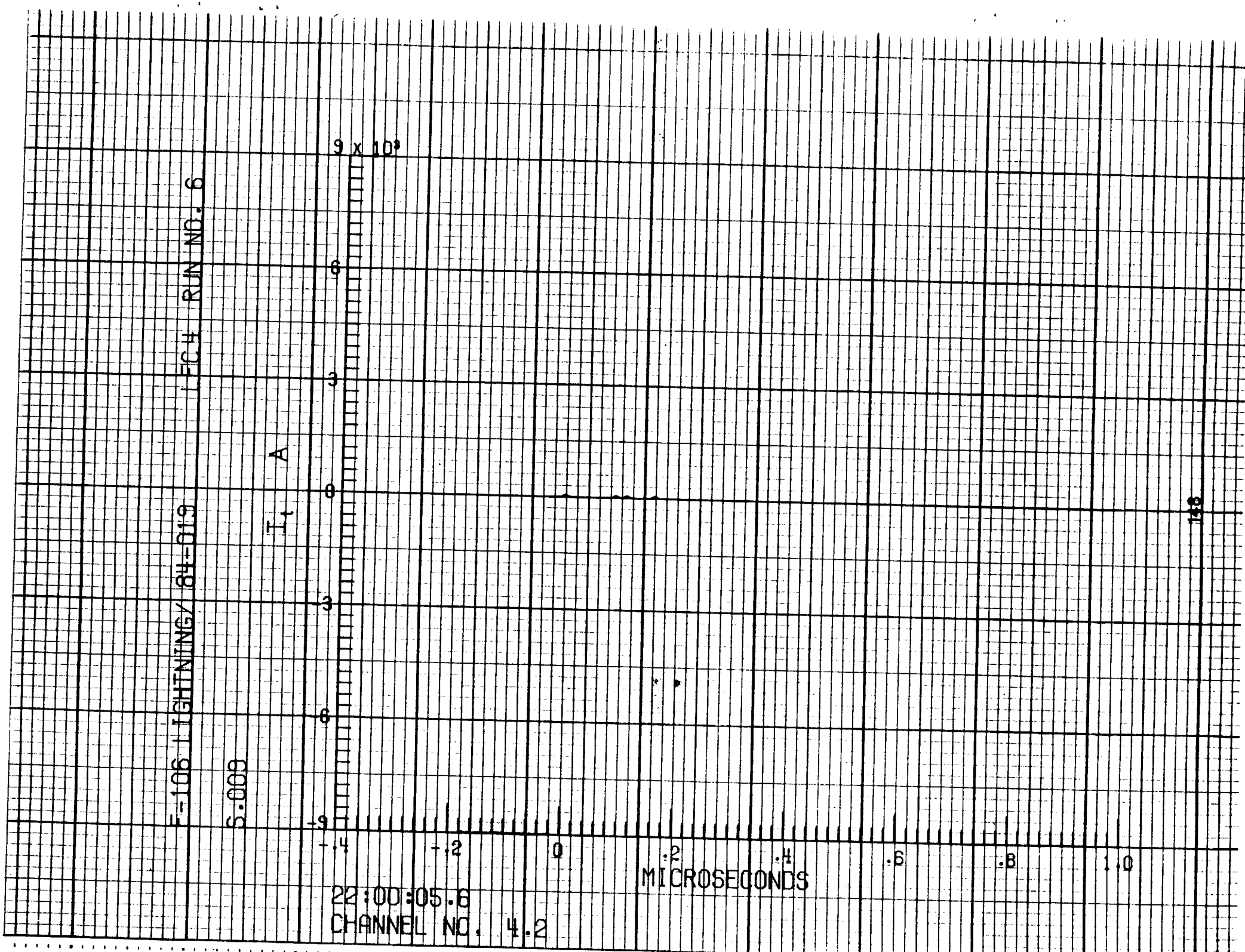
OF POOR QUALITY


9 x 10³
6
3
0
-3
-6
-9
I_t A
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
F-106 LIGHTNING/ 84-019
FC4 RUN NO. 6
5.009
22:00:05.6
CHANNEL NO. 4.2
146

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-020 LEC1 RUN NO. 1

0.001

$\dot{B}_{w1}$ T/s

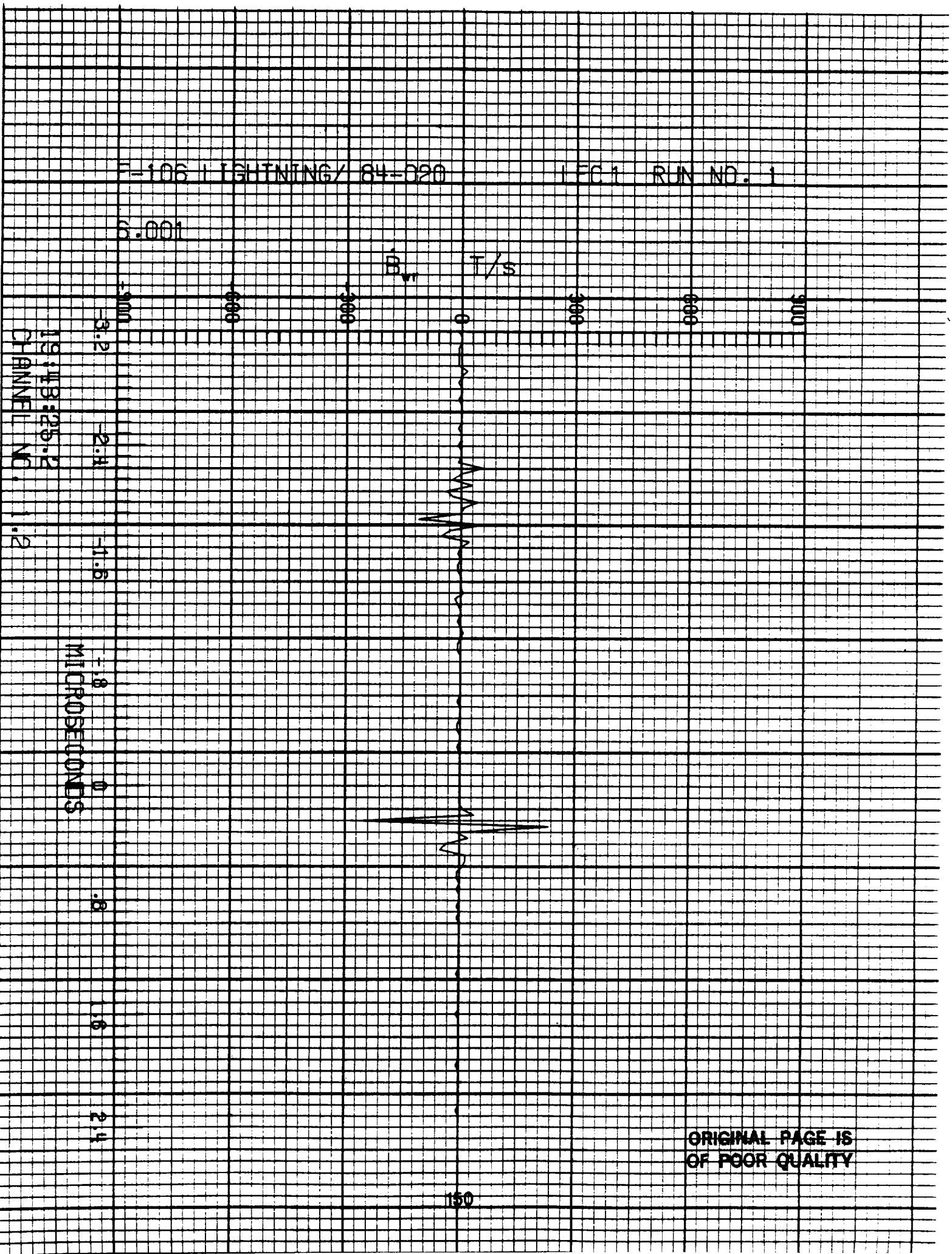
-800 -600 -400 -200 0 200 400 600 800

-3.2 -2.4 -1.6 -.8 0 .8 1.6 2.4

MICROSECONDS

19:48:25.2

CHANNEL NO. 1



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F-106 LIGHTNING/ 84-020 LFC2 RUN NO. 1

6.001

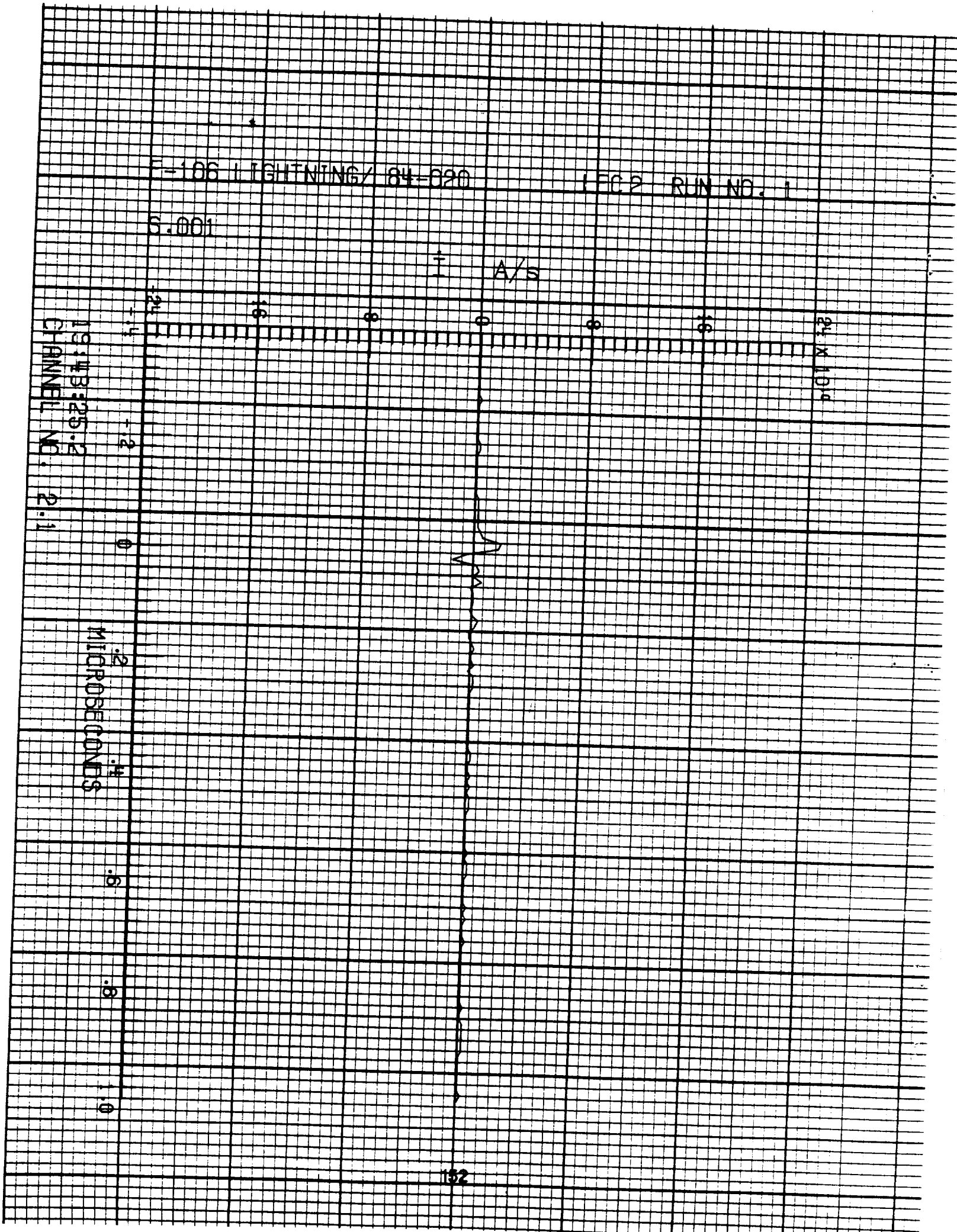
$\dot{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

15:48:25.2
CHANNEL NO. 2.0


F-106 LIGHTNING/ 84-020
LFC2 RUN NO. 1
S.001
I A/s
-24
-16
-8
0
8
16
24 x 10^4
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:43:25.2
CHANNEL NO. 2.1

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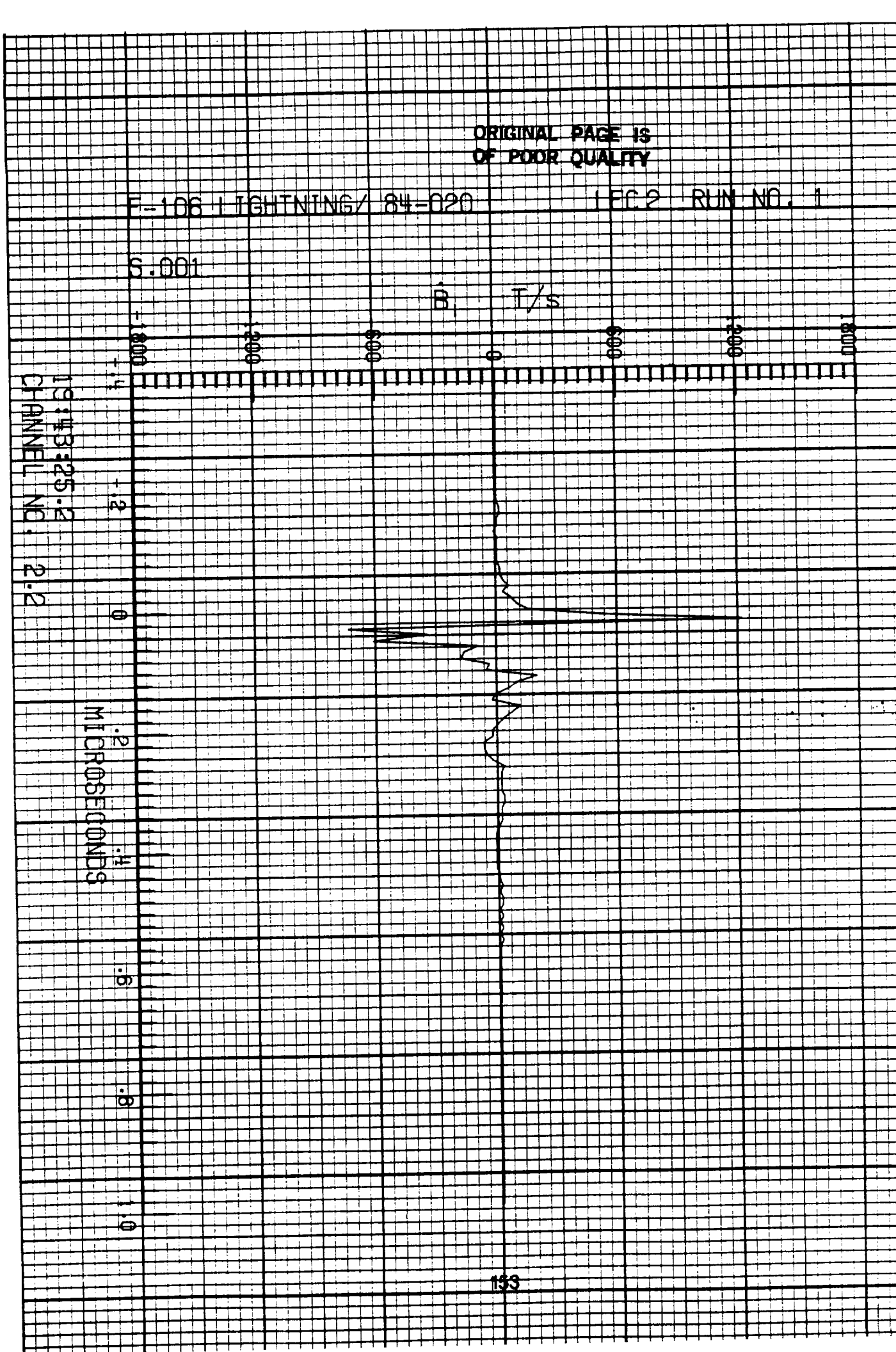
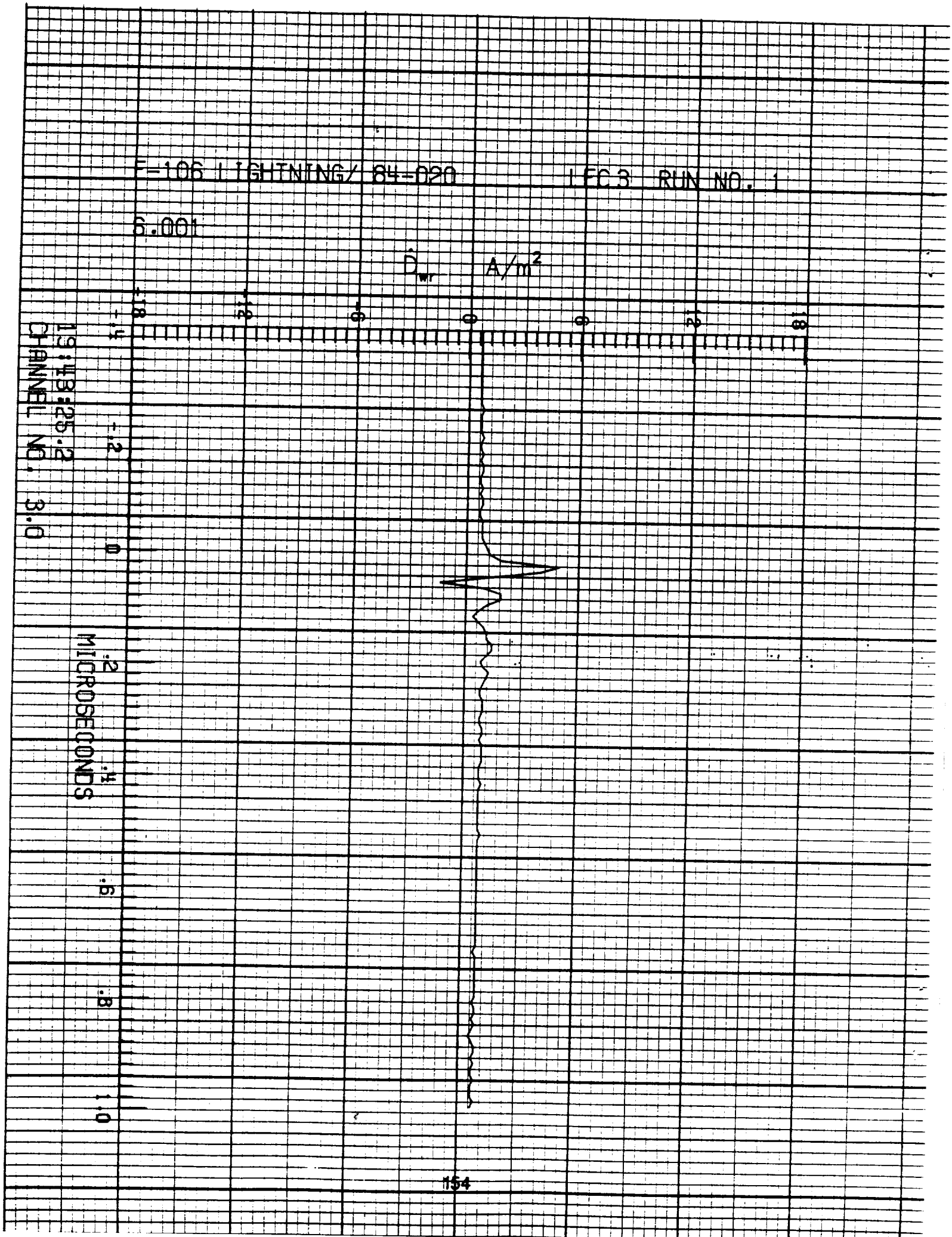
F-106 LIGHTNING/ 84-020 LEC 2 RUN NO. 1




F-106 LIGHTNING/ 84-020
LFC3 RUN NO. 1
6.001
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:43:25.2
CHANNEL NO. 3.0

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F-106 LIGHTNING/ 84-020 LEC 3 RUN NO. 1

6.001

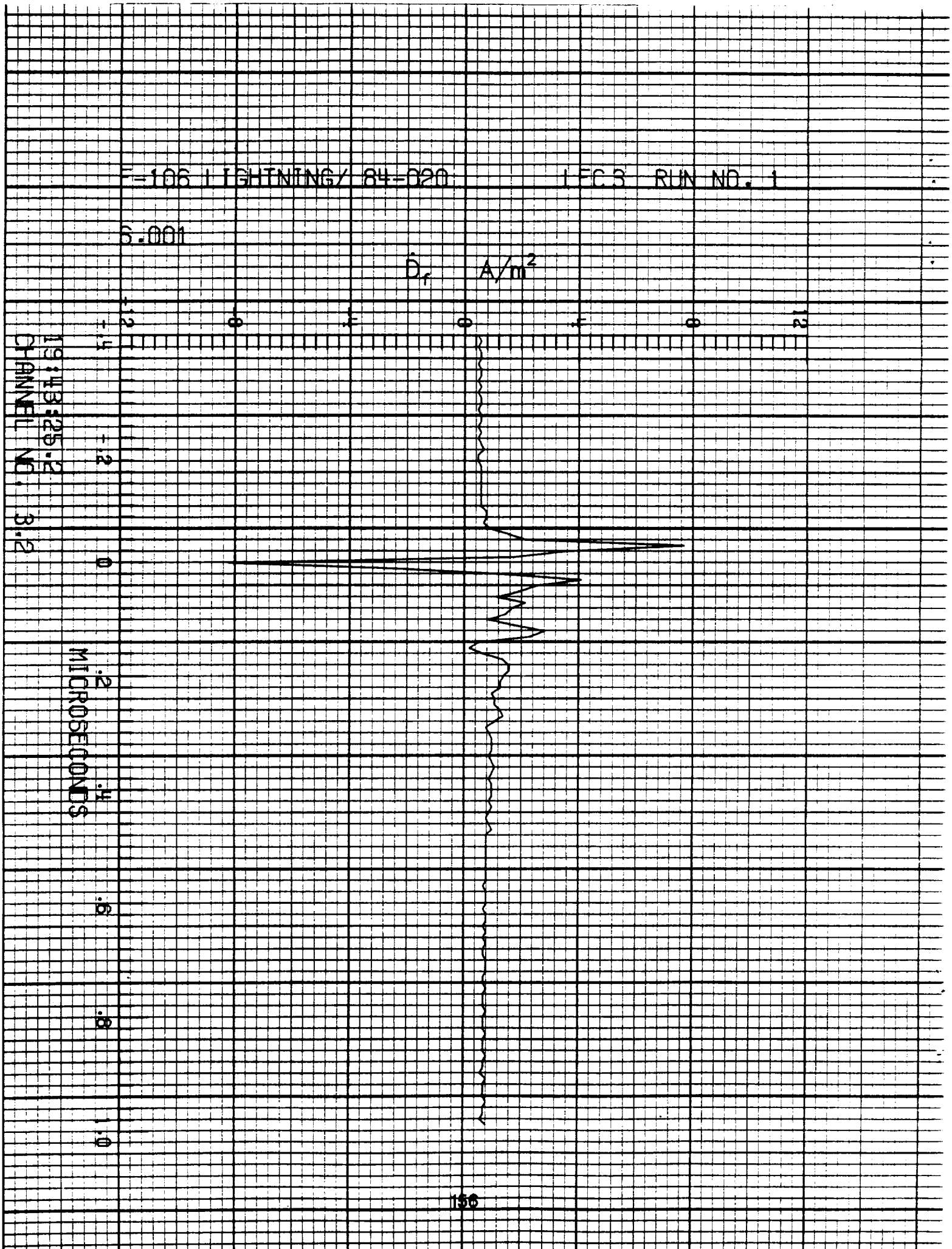
$\dot{D}_{wi}$ A/m^2

+18 +12 +6 0 -6 -12 -18

+1.4 +1.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

15:48:25.12
CHANNEL NO: 3.1


F-106 LIGHTNING/ 84-020
LFC3 RUN NO. 1
6.001
$\dot{D}_f$ A/m²
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:43:25.2
CHANNEL NO. 3.2

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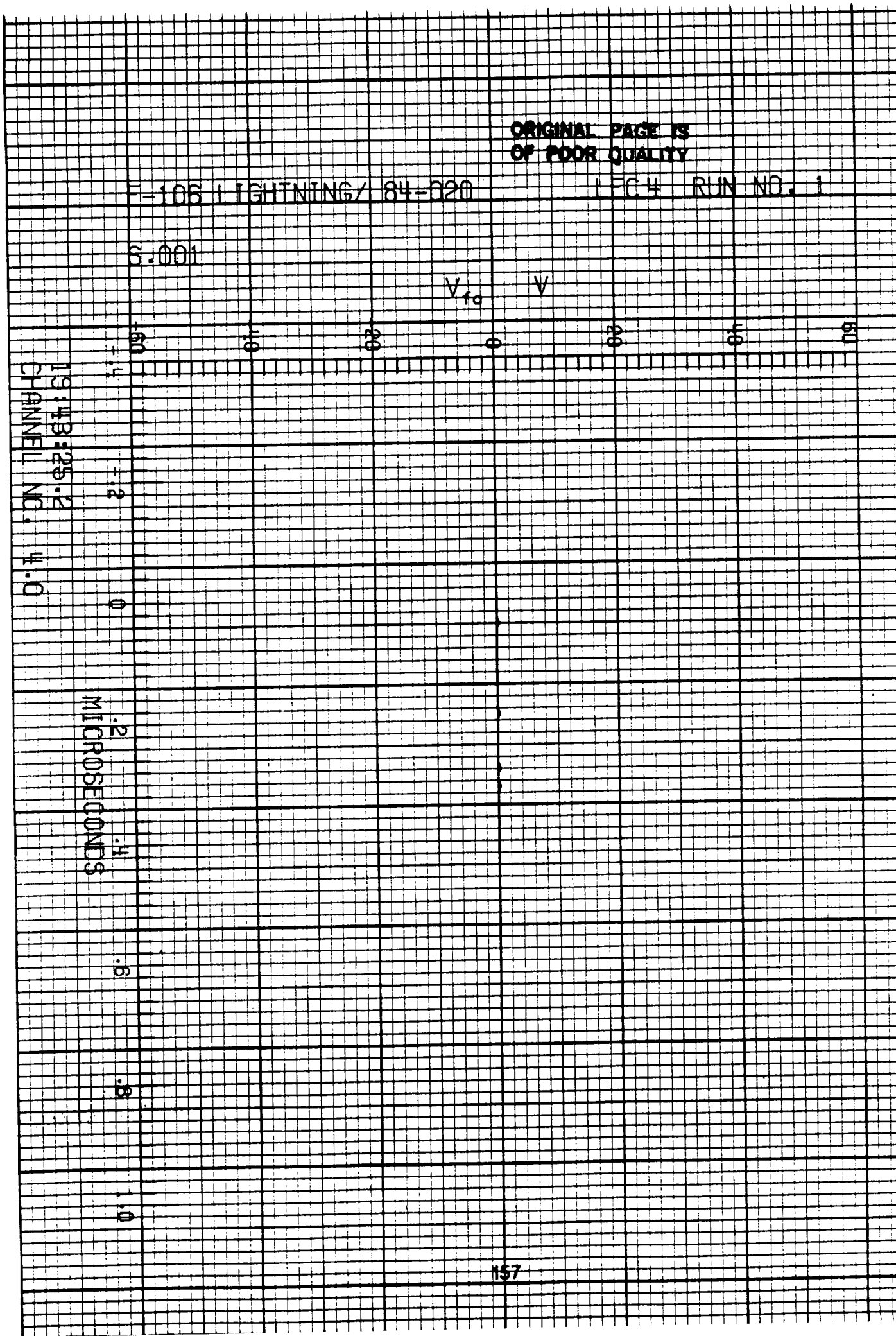

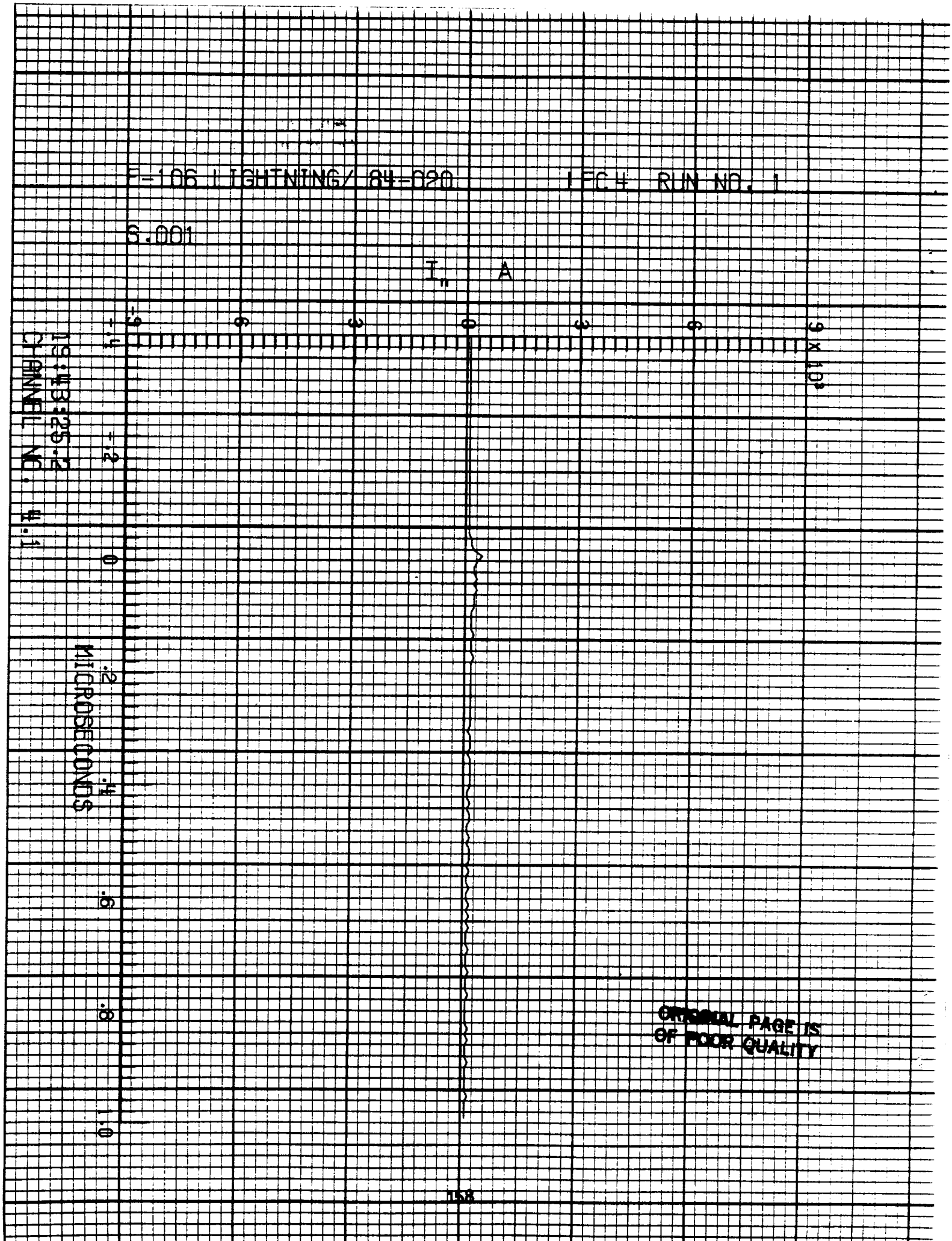

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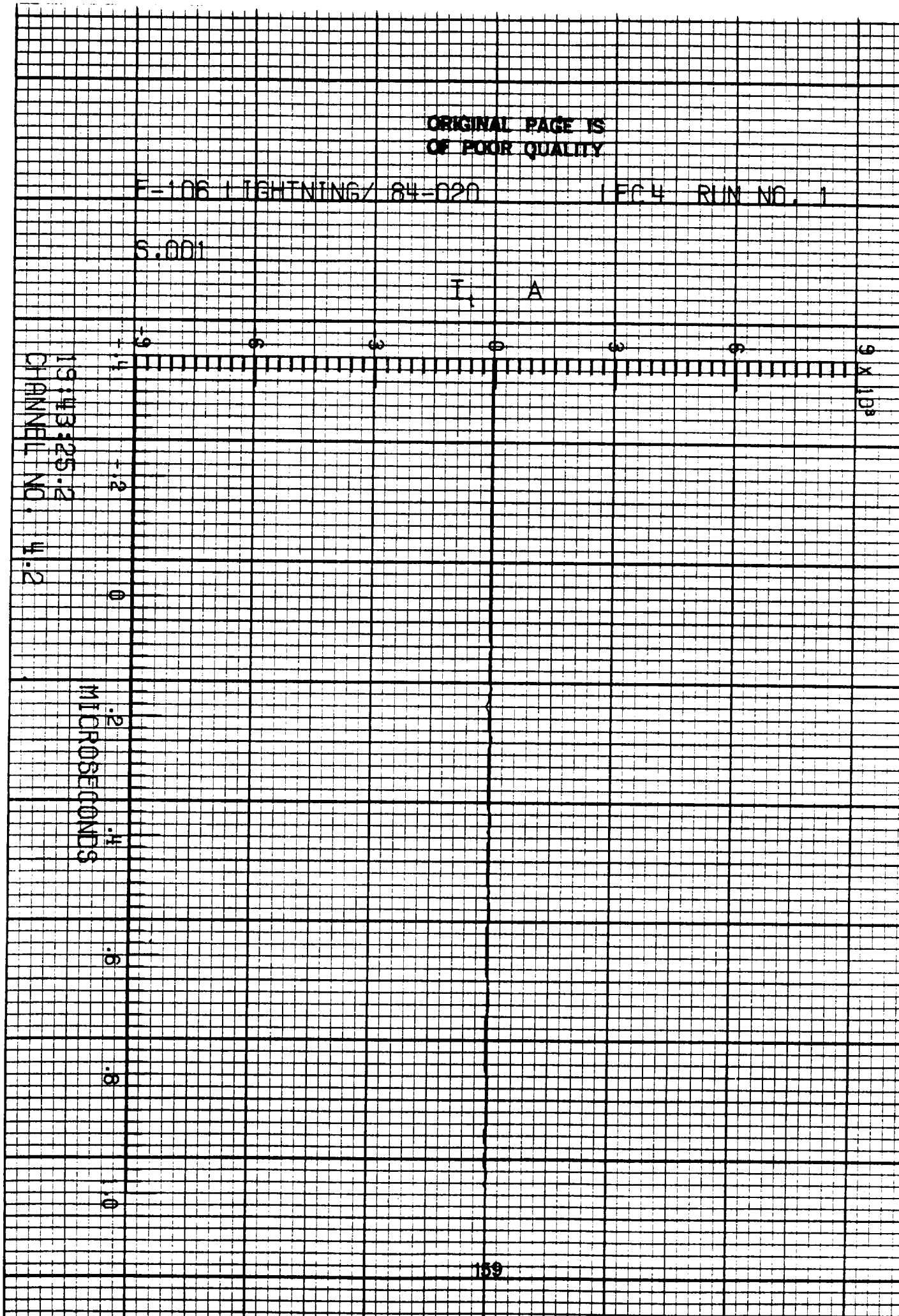

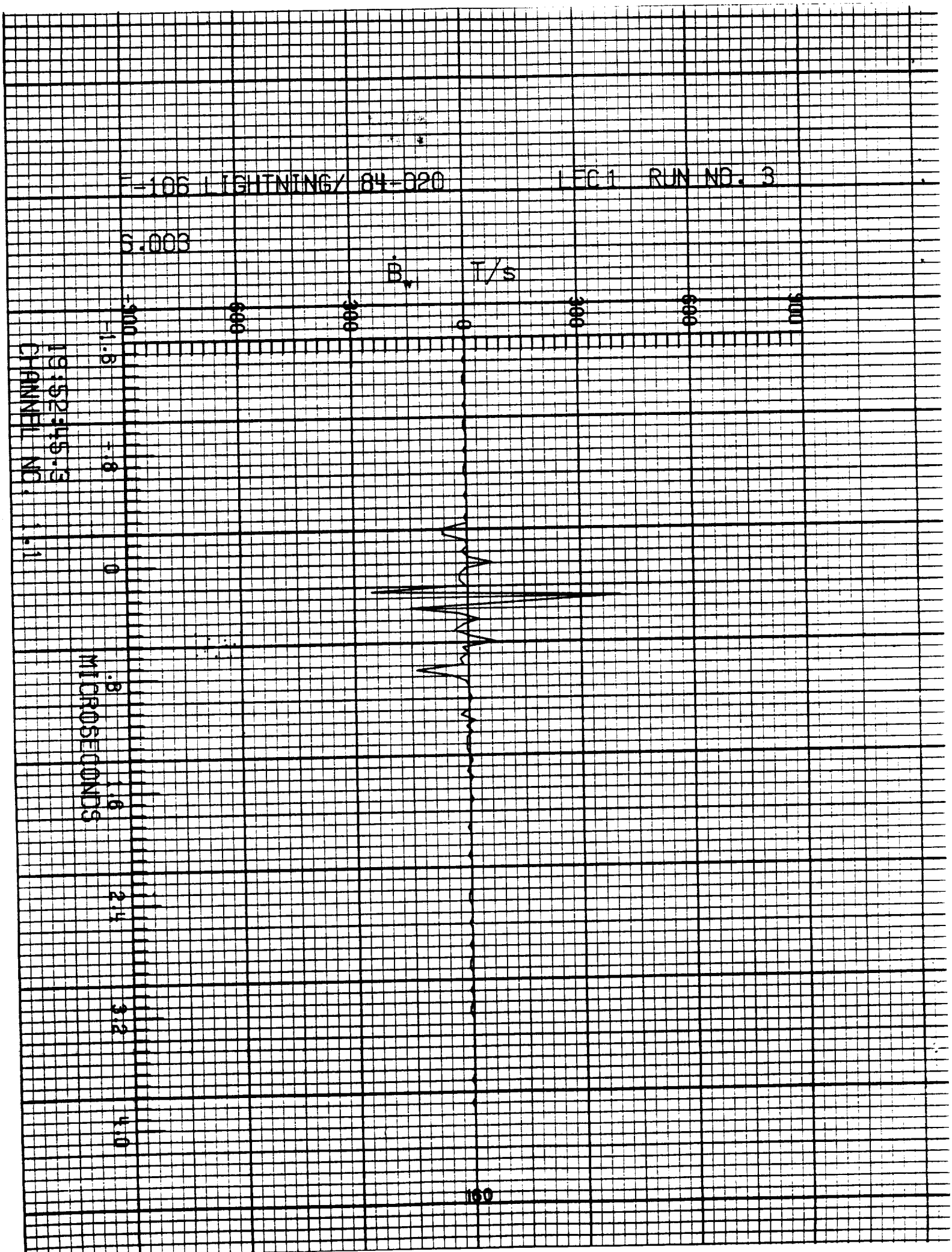
F-106 LIGHTNING/ 84-020
LEC 1 RUN NO. 3
S.003
$\dot{B}_w$ T/s
-900
-600
-300
0
300
600
900
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
19:52:45.3
CHANNEL NO. 1.1

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F=106 LIGHTNING/ 84-020 1 EC 1 RUN NO. 3

6.008

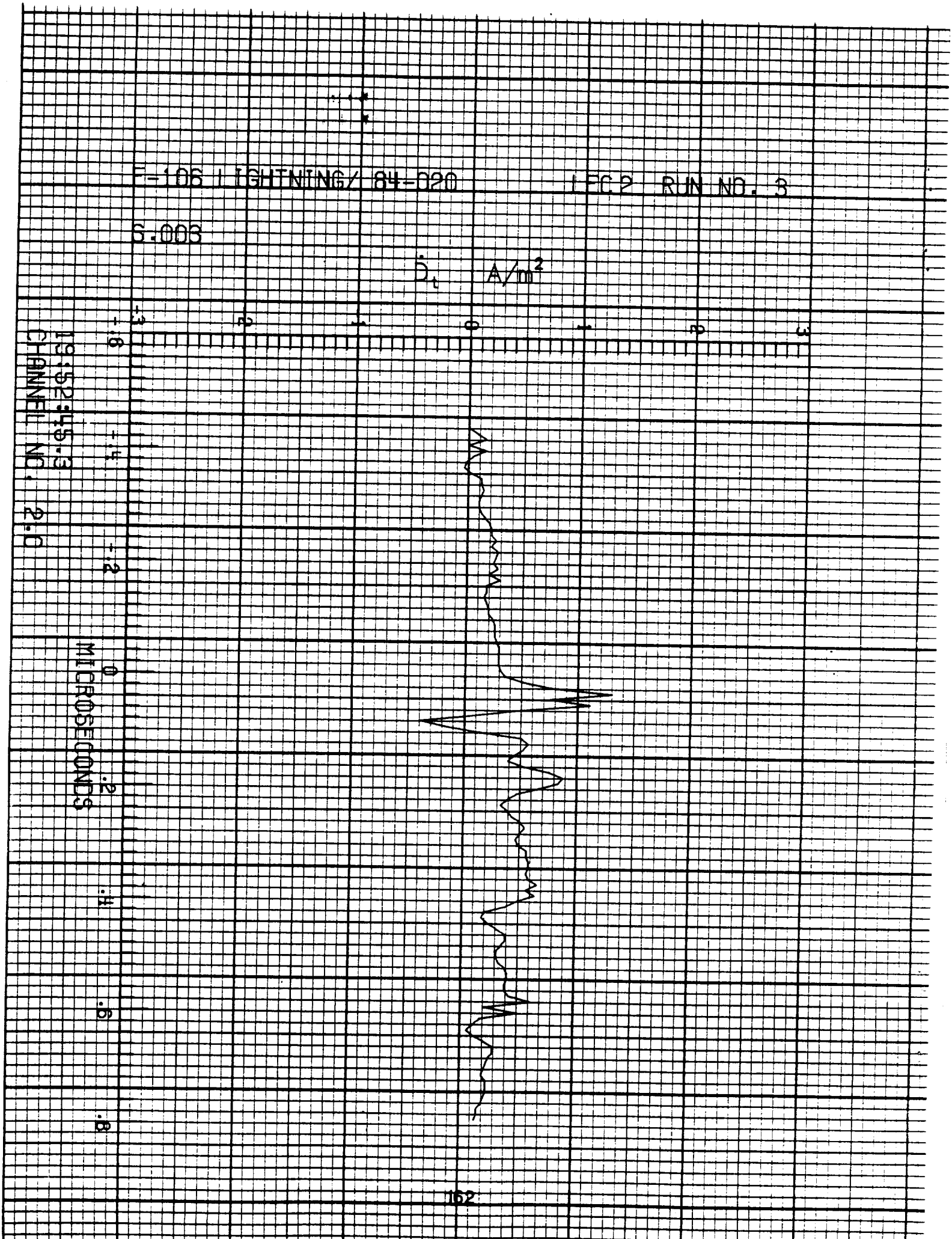
$\dot{B}_{wr}$ T/s

-600 -400 -200 0 200 400 600

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0

MICROSECONDS

CHANNEL NO. 1 19:52:45.3


F-106 LIGHTNING/ 84-020
LEC 2 RUN NO. 3
6.003
$\dot{D}_t$ A/m^2
-3
-2
-1
0
1
2
3
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:52:45.3
CHANNEL NO. 2.0

ORIGINAL PAGE IS
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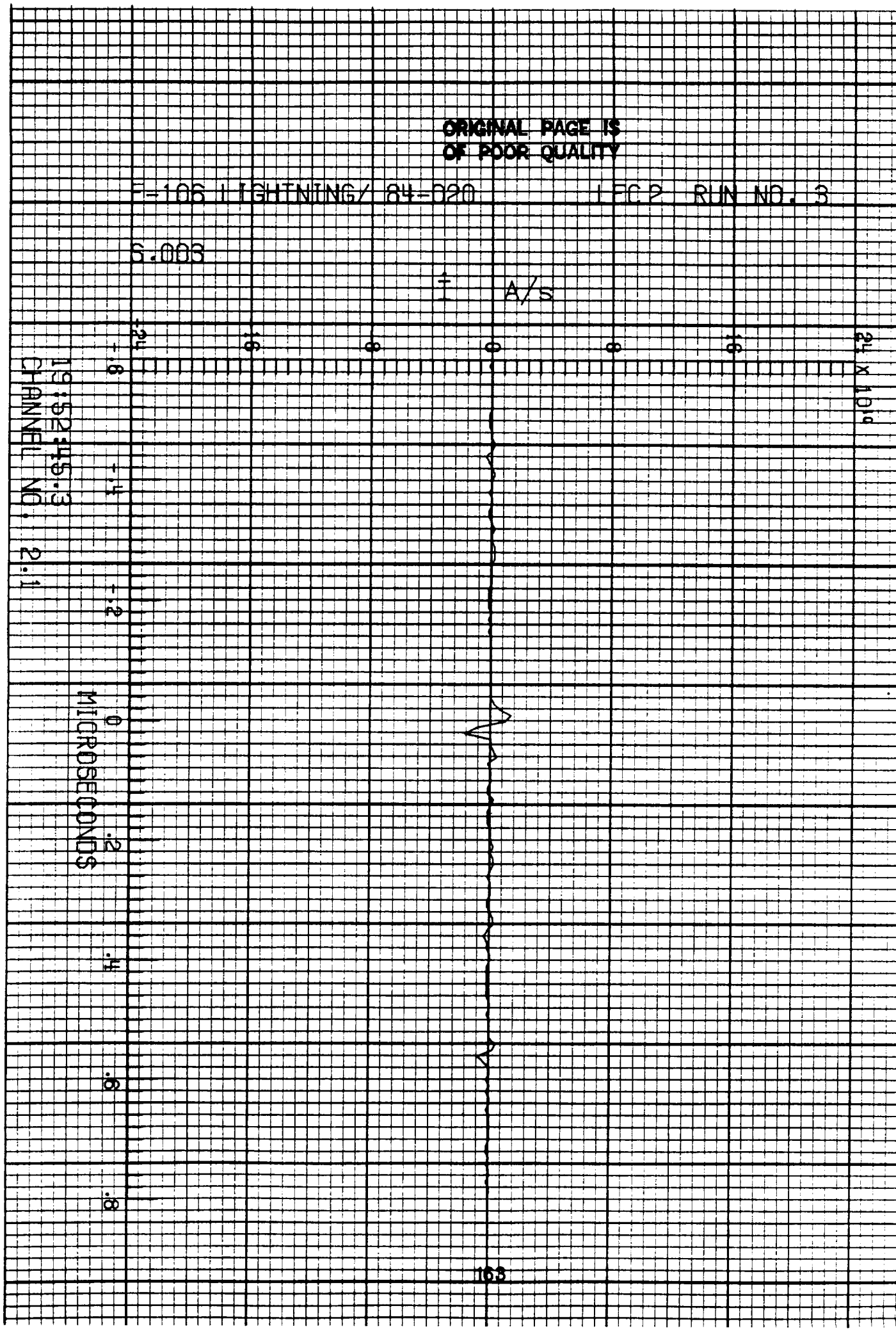

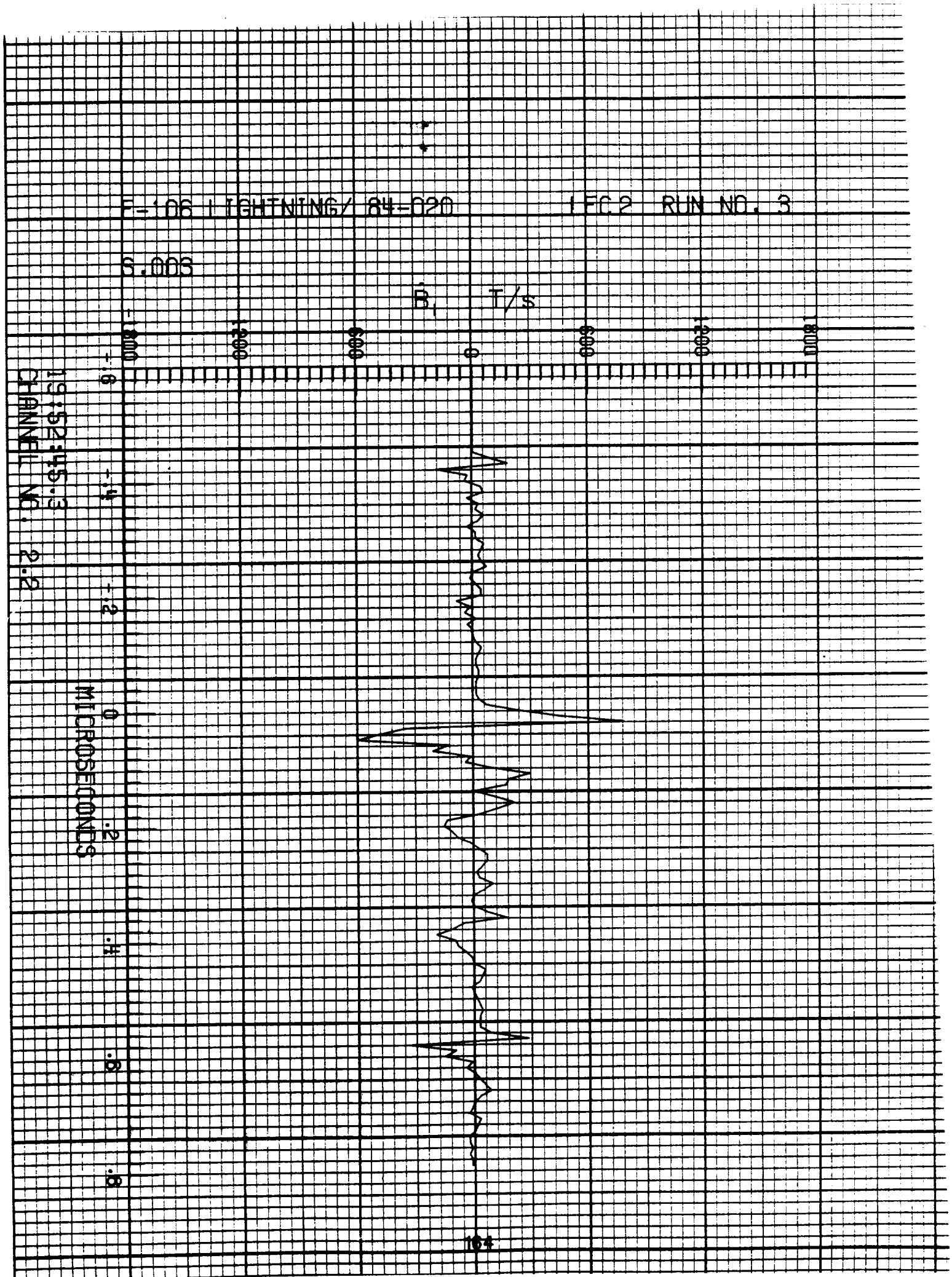
F-106 LIGHTNING/ 84-020
LFC2 RUN NO. 3
S.00S
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:52:45.3
CHANNEL NO. 2.2

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F-106 LIGHTNING/ 84-020 LEC 3 RUN NO. 3

6.003

D_{wr} A/m^2

-1.8 -1.5 -1.2 -.9 -.6 -.3 0 .3 .6 .9 1.2 1.5 1.8

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

19:52:45.3
CHANNEL NO. 8.0

-106 LIGHTNING/ 84-020 LEC3 RUN NO. 3

6.003

$\dot{D}_{wi}$ A/m^2

-18 -12 -6 0 6 12 18

-.8 -.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

19:52:45.3

CHANNEL NO.: 8.11

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F=106 LIGHTNING/ 84-020 LFC 3 RUN NO. 3

6.008

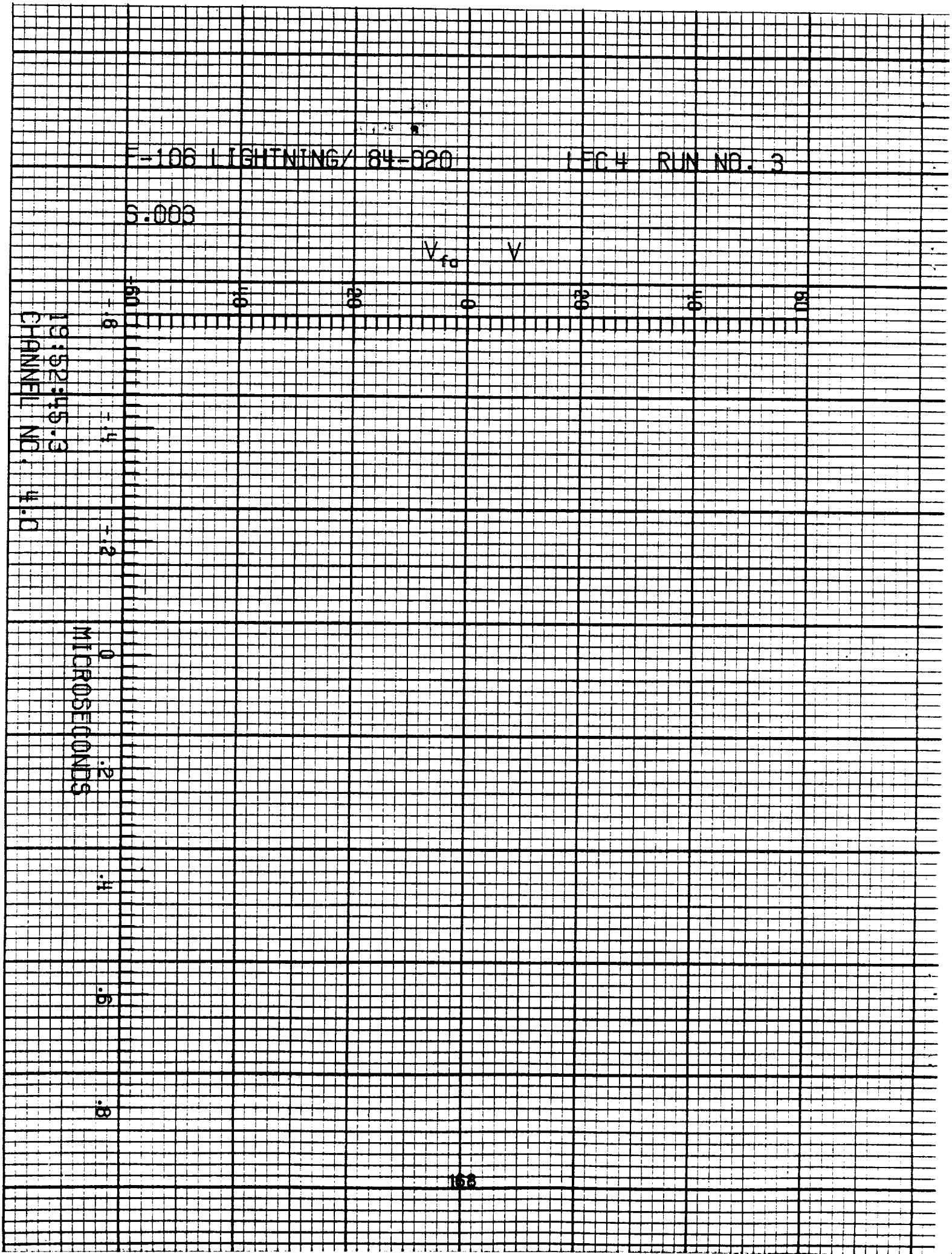
$\dot{D}_f$ A/m^2

+12 +8 +4 0 -4 -8 -12

+1.6 +1.4 +1.2 +1.0 +.8 +.6 +.4 +.2 0 -.2 -.4 -.6 -.8

MICROSECONDS

19:52:45.3
CHANNEL NO. 3.2


F-106 LIGHTNING/ 84-020
LEC 4 RUN NO. 3
S.003
V_{fo} V
-60
-40
-20
0
20
40
60
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:52:45.3
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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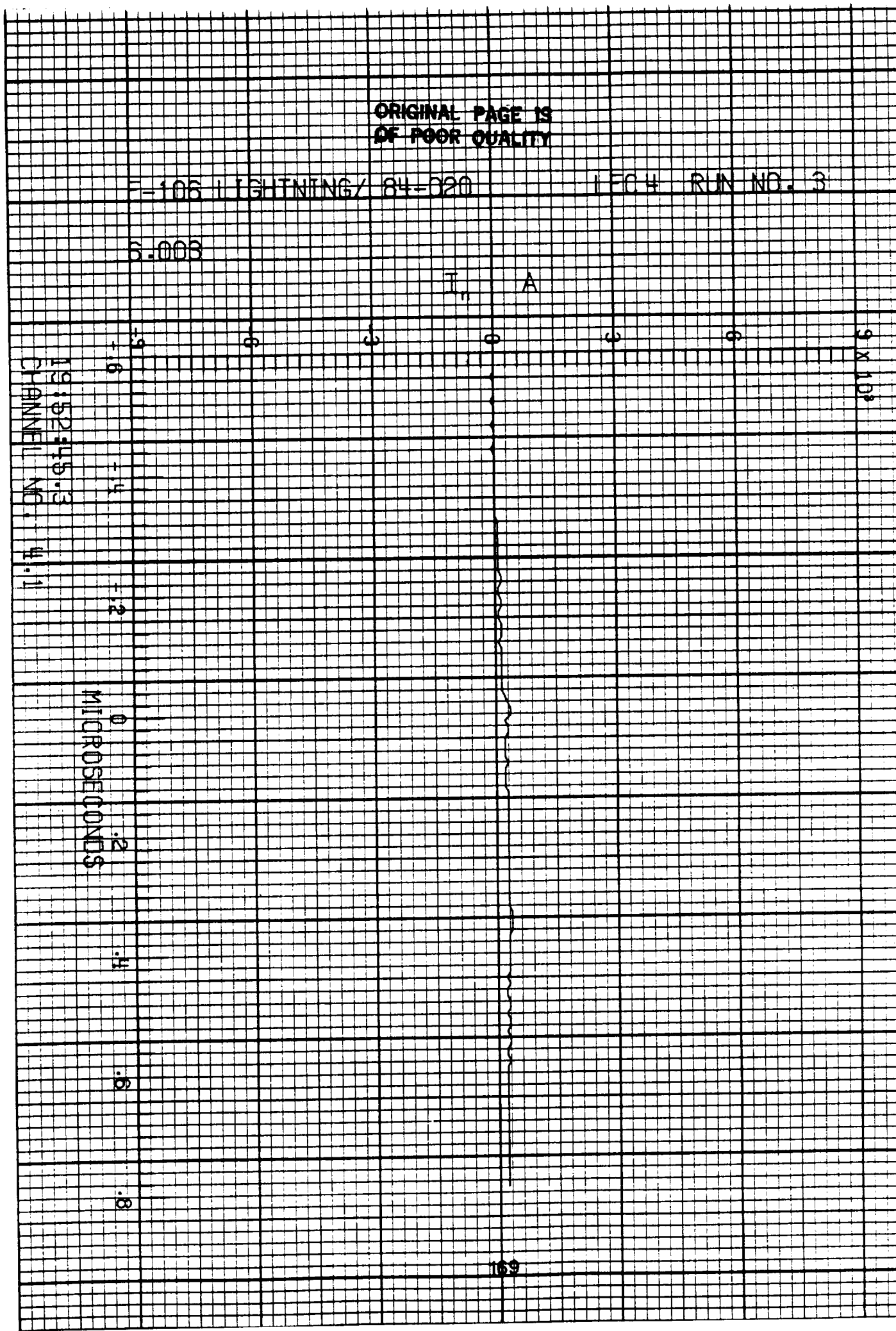

F-106 LIGHTNING/ 84-020 IFC 4 RUN NO. 3

6.008

I_t A

6 x 10³

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

19:52:45.3

CHANNEL NO. #2

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F=106 LIGHTNING/ 84=020 LEC 1 RUN NO. 4

N.001

$\dot{B}_{w1}$ T/s

-800 -600 -400 -200 0 200 400 600 800

-1.8 0 1.8

15:56:19.8
CHANNEL NO. 1.1

1.6 2.4 3.2 4.0 4.8
MICROSECONDS

F=106 LIGHTNING/ 84=020 IFC-1 RUN NO. 4

V.001

$\dot{B}_{wr}$ T/S

-800 -600 -400 -200 0 200 400 600 800

-0.8 0 0.8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

CHANNEL NO. 1:2 15:55:19.95

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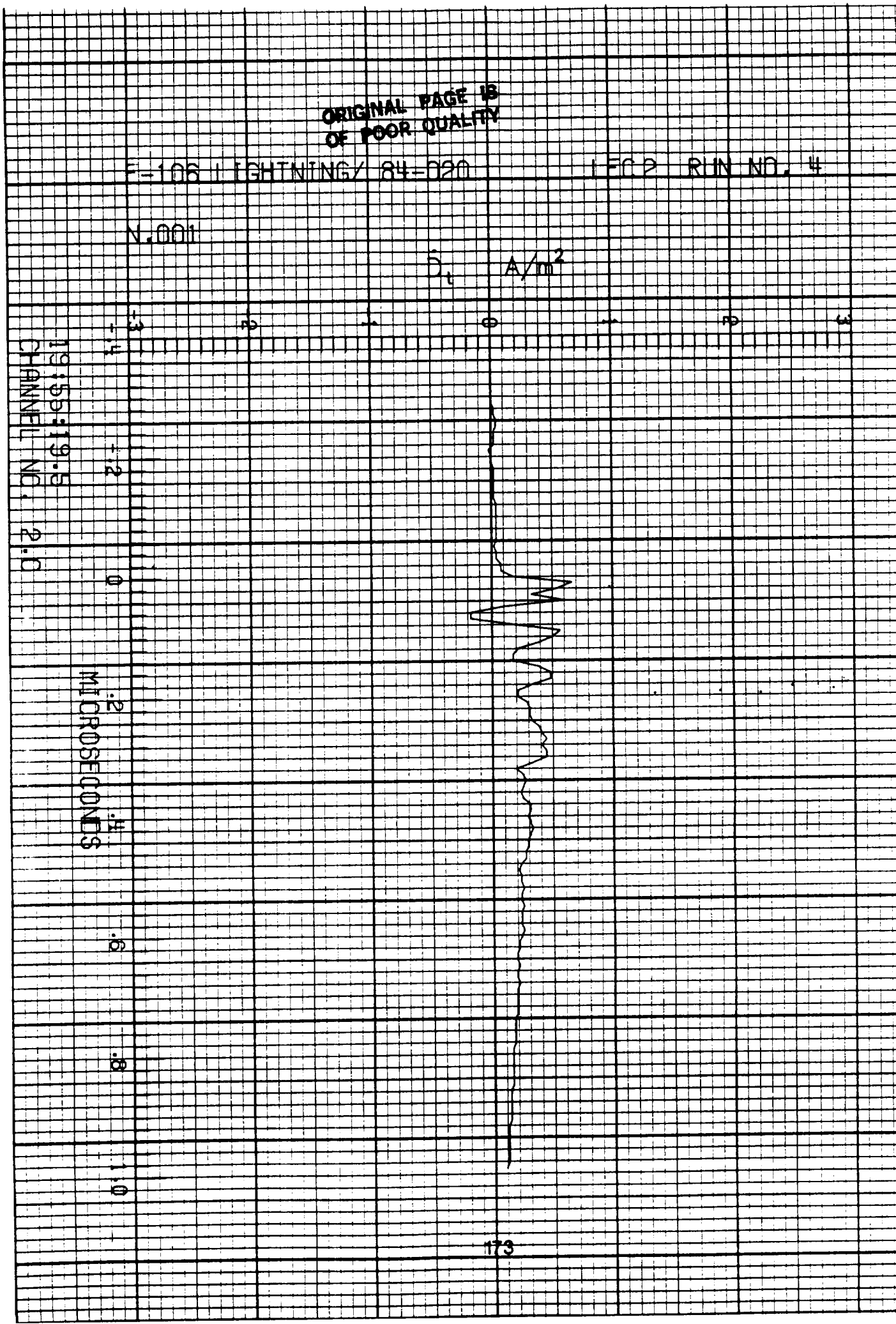

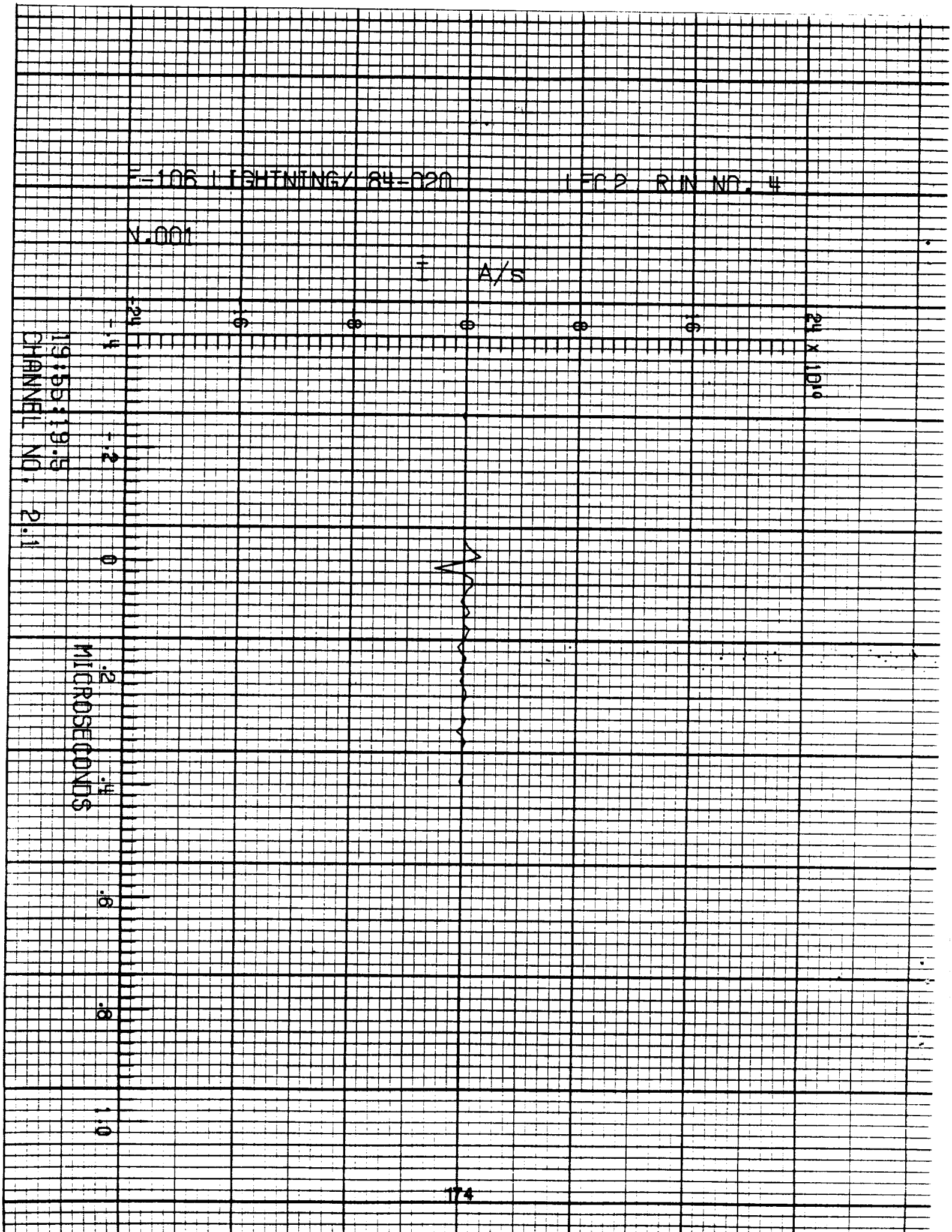
F-106 LIGHTNING/ 84-020
LFC 2 RUN NO. 4
N.001
I A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:55:19.5
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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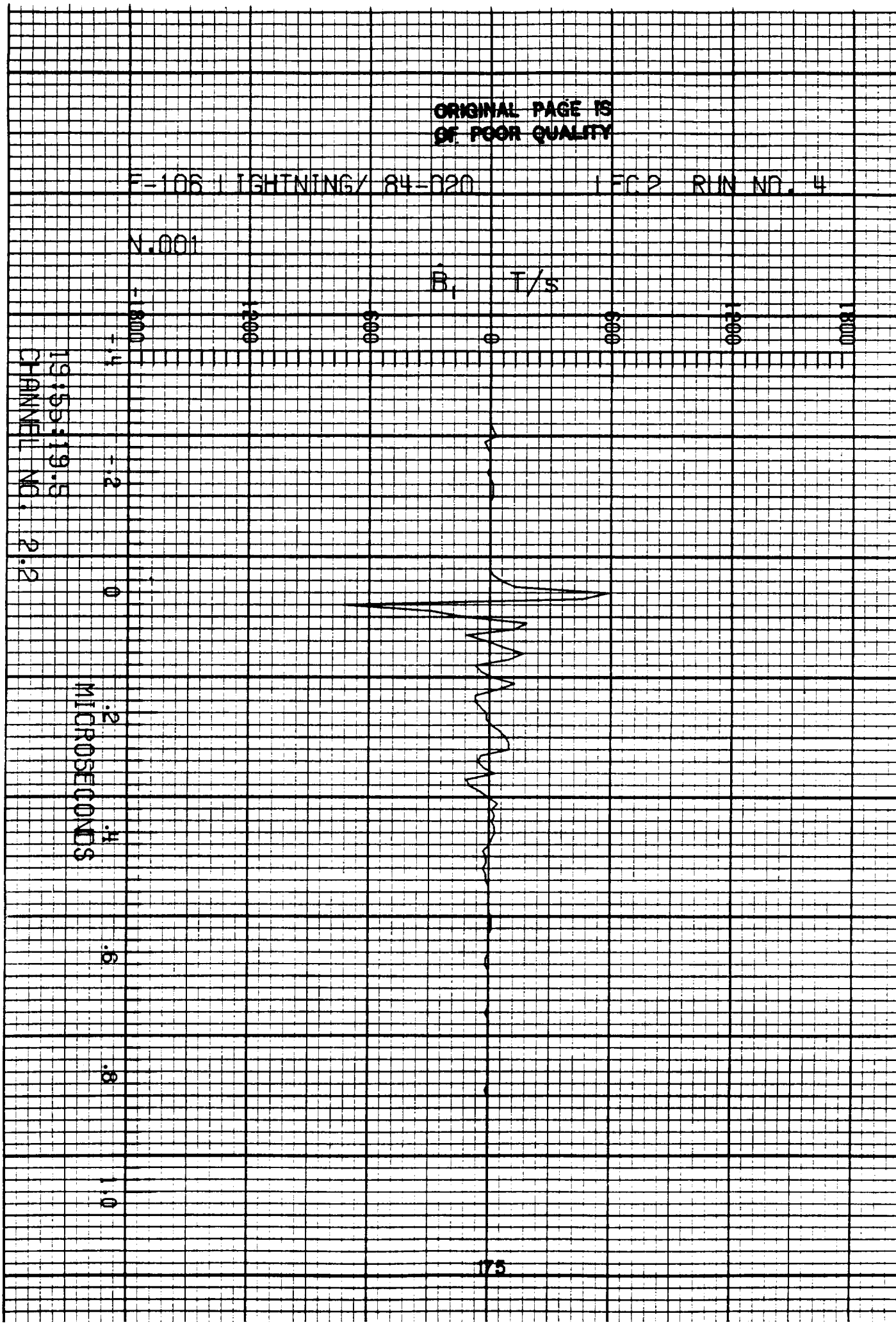

F-106 LIGHTNING/ 84-020 IFC3 RUN NO. 4

N.001

$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

CHANNEL NO. 3.0

19:55:19.5

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F-106 LIGHTNING/ 84-020 LFC 3 RUN NO. 4

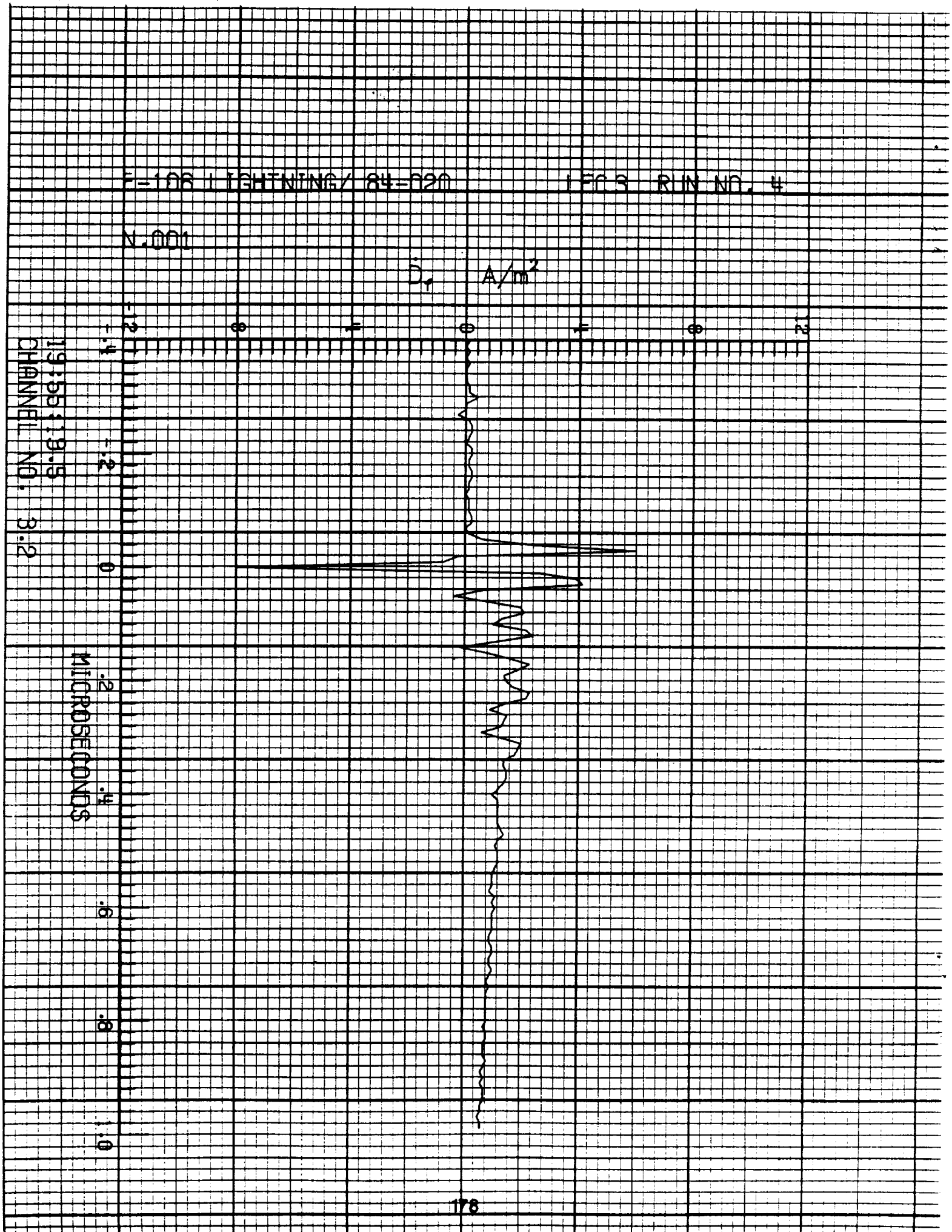
N.001

$\hat{D}_{wt}$ A/m^2

+1.4
+1.2
0
-.2
-.4
-.6
-.8
-1.0

MICROSECONDS

19:59:19.5
CHANNEL NO. 3.1


F-106 LIGHTNING/ 84-020
LFC 3 RUN NO. 4
N.001
$\dot{D}_f$ A/m²
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:55:19.5
CHANNEL NO. 3.2

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OF POOR QUALITY

F-106 LIGHTNING/ 84-020 LEC 4 RUN NO. 4

N.001

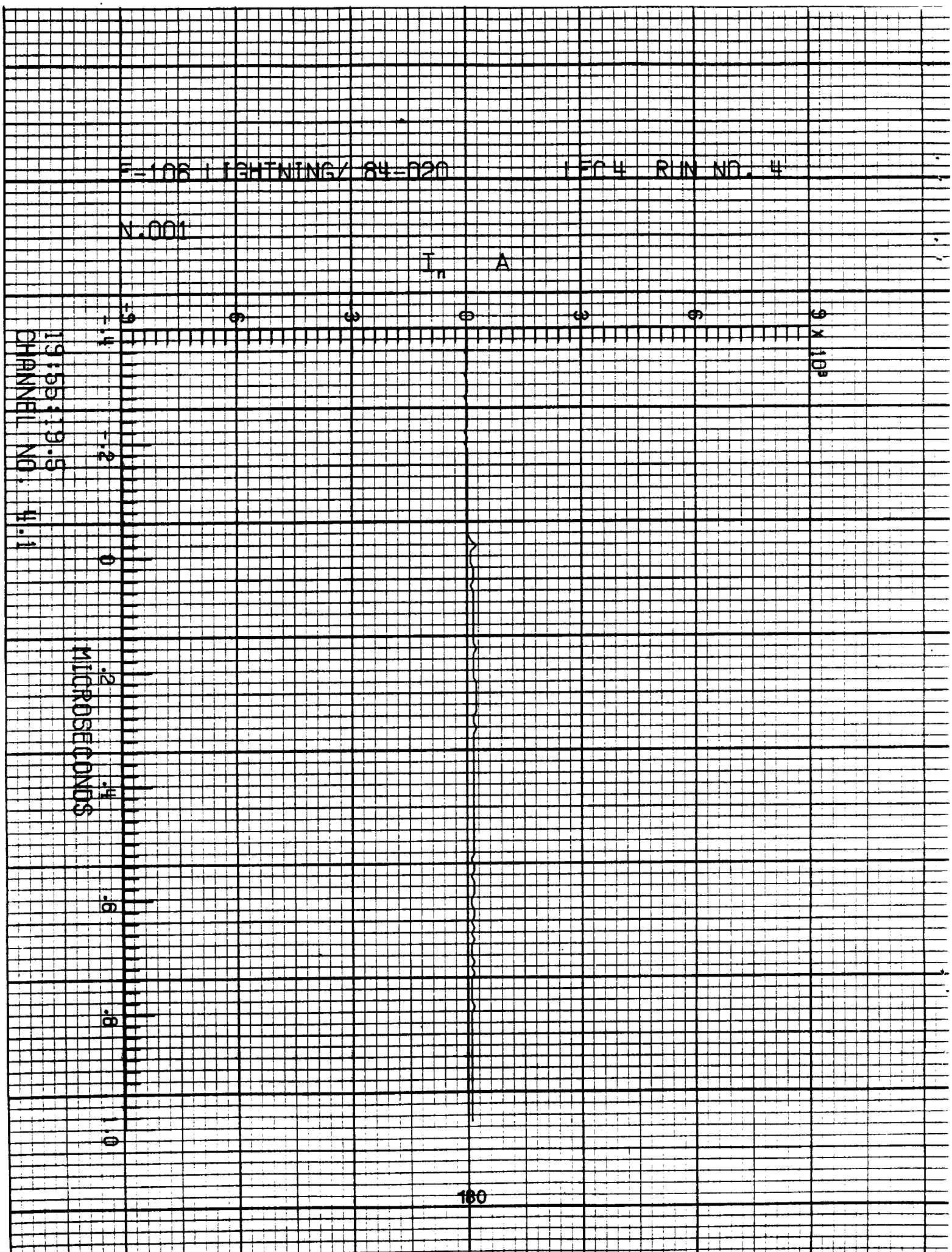
V_{fa} V

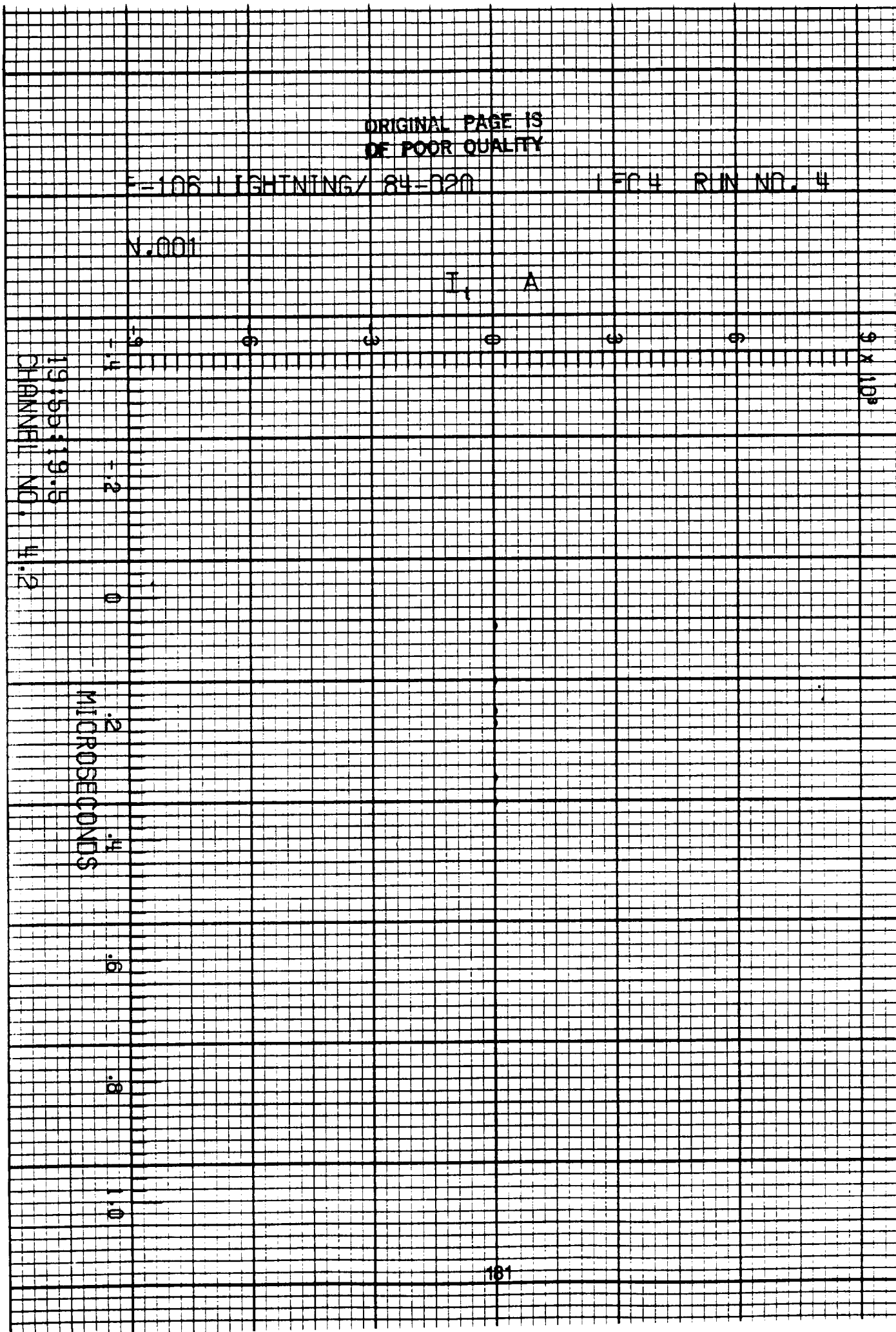
+60 +40 +20 0 -20 -40 -60

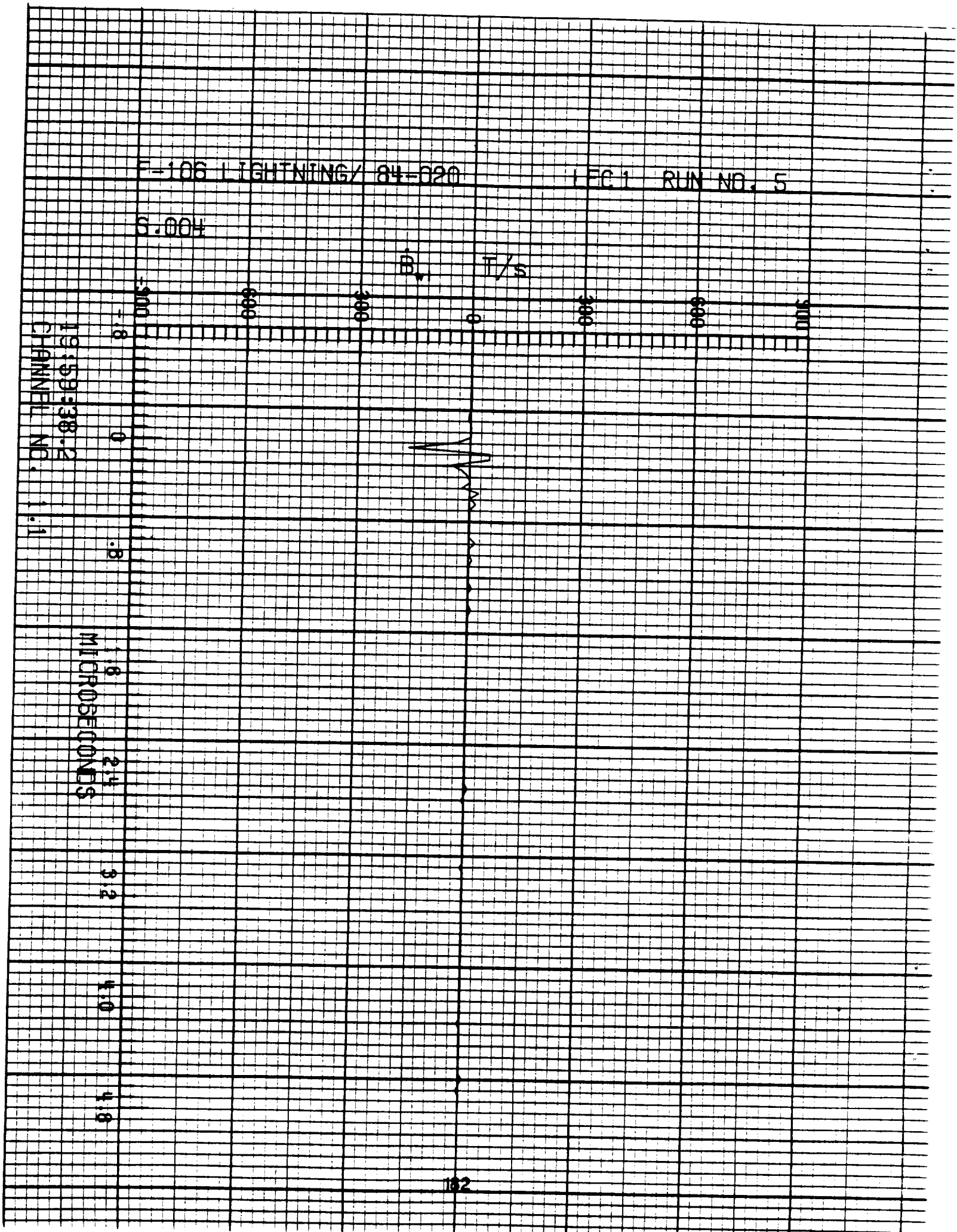
-1.4
-1.2
0
.2
.4
.6
.8
1.0

MICROSECONDS

19:55:19.5
CHANNEL NO. 4.0


F-106 LIGHTNING/ 84-020
LEC 4 RUN NO. 4
N.001
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:55:19.5
CHANNEL NO. 4.1


ORIGINAL PAGE IS
OF POOR QUALITY
F-106 LIGHTNING/ 84-020
LFC4 RUN NO. 4
N.001
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:55:19.5
CHANNEL NO. 4.2


F-106 LIGHTNING/ 84-020
LEC1 RUN NO. 5
S.004
$\dot{B}_w$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:59:38.2
CHANNEL NO. 1.1

ORIGINAL PAGE IS
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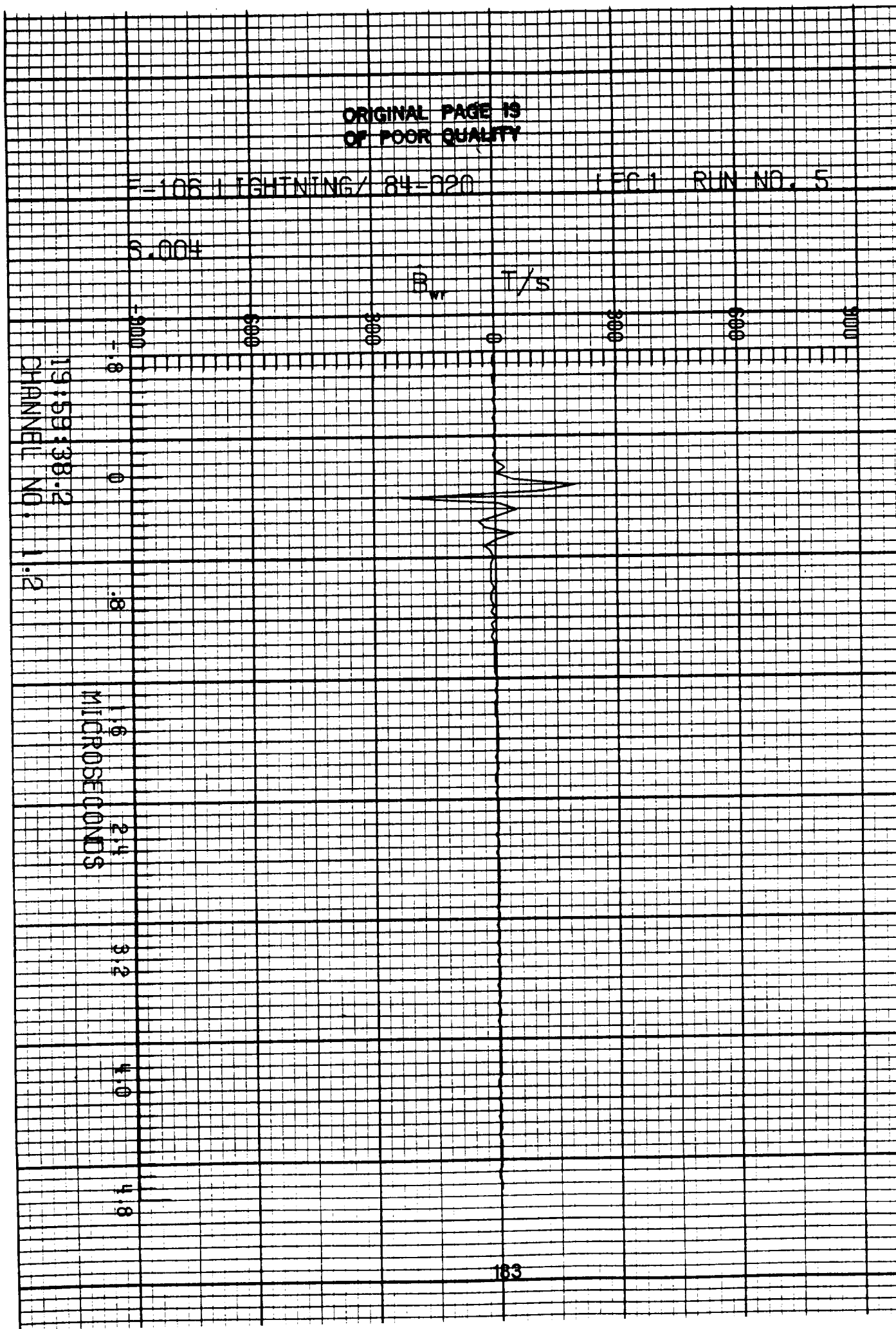
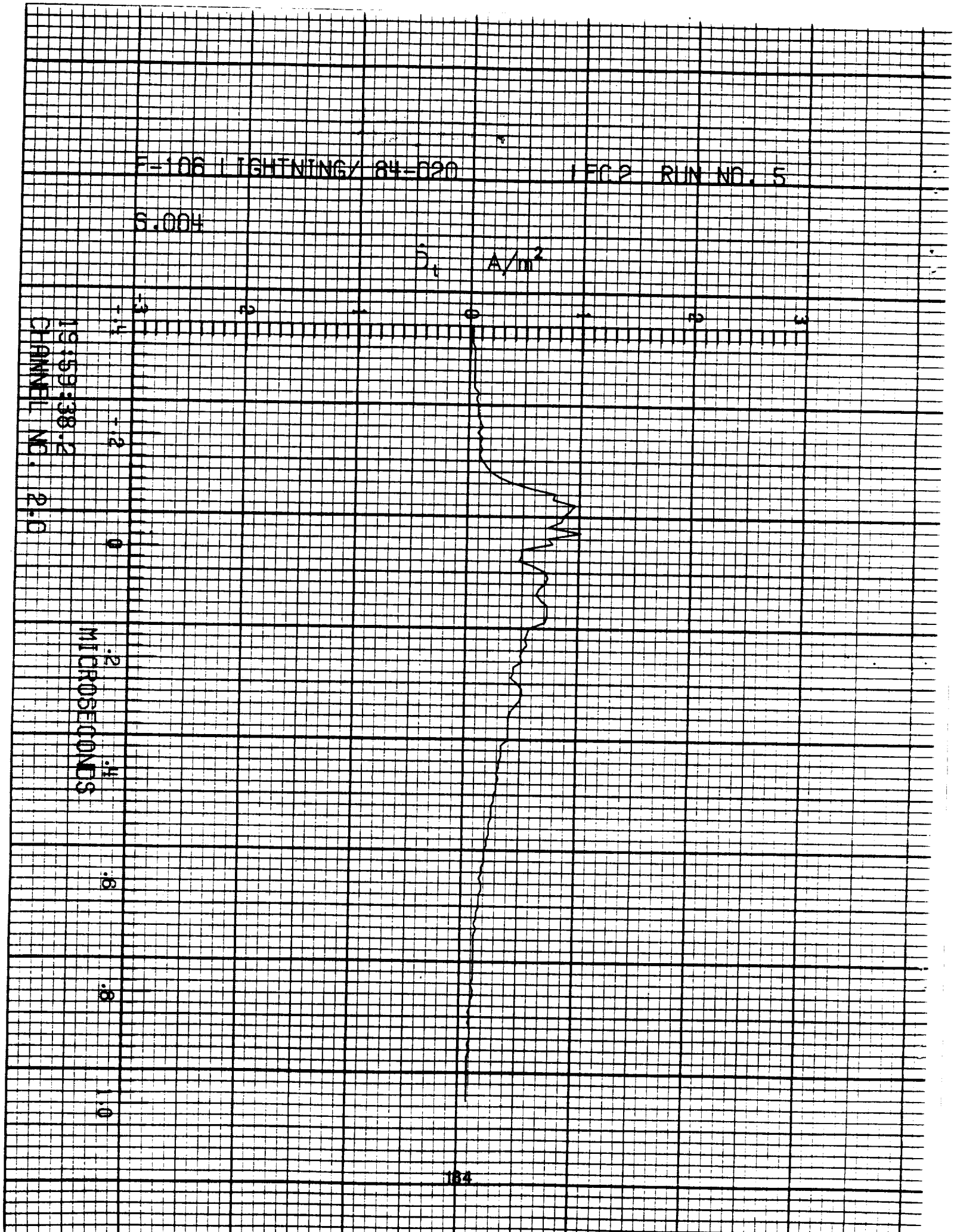
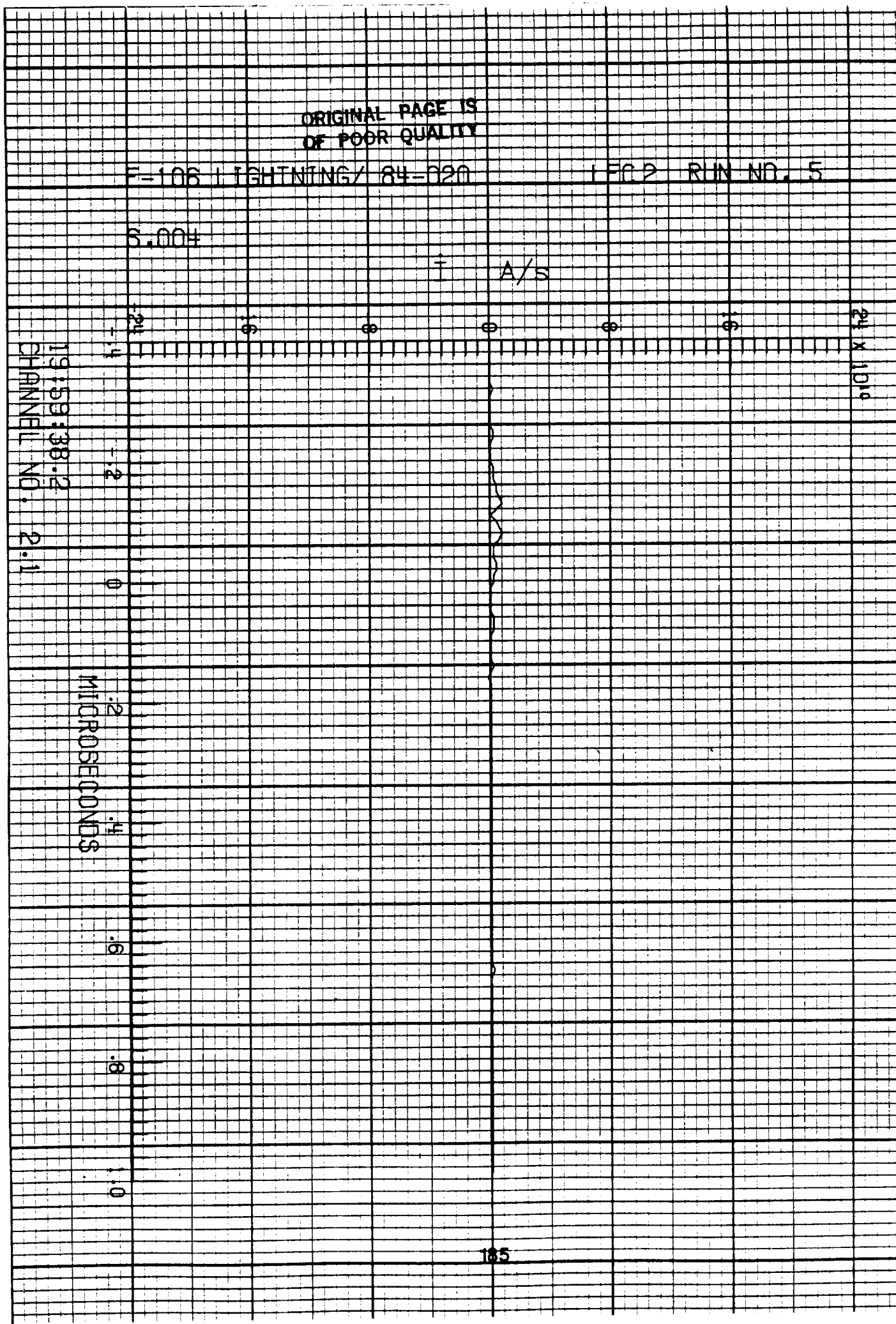



F-106 LIGHTNING/ 84-020
LEC2 RUN NO. 5
S.004
$\dot{D}_t$ A/m²
-3
-2
-1
0
1
2
3
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:59:38.2
CHANNEL NO. 2.0

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-020 (FC2 RUN NO. 5

6.00+

$\dot{B}_i$ T/s

-1800 -1200 -600 0 600 1200 1800

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

19:59:38.2

CHANNEL NO. 2.2

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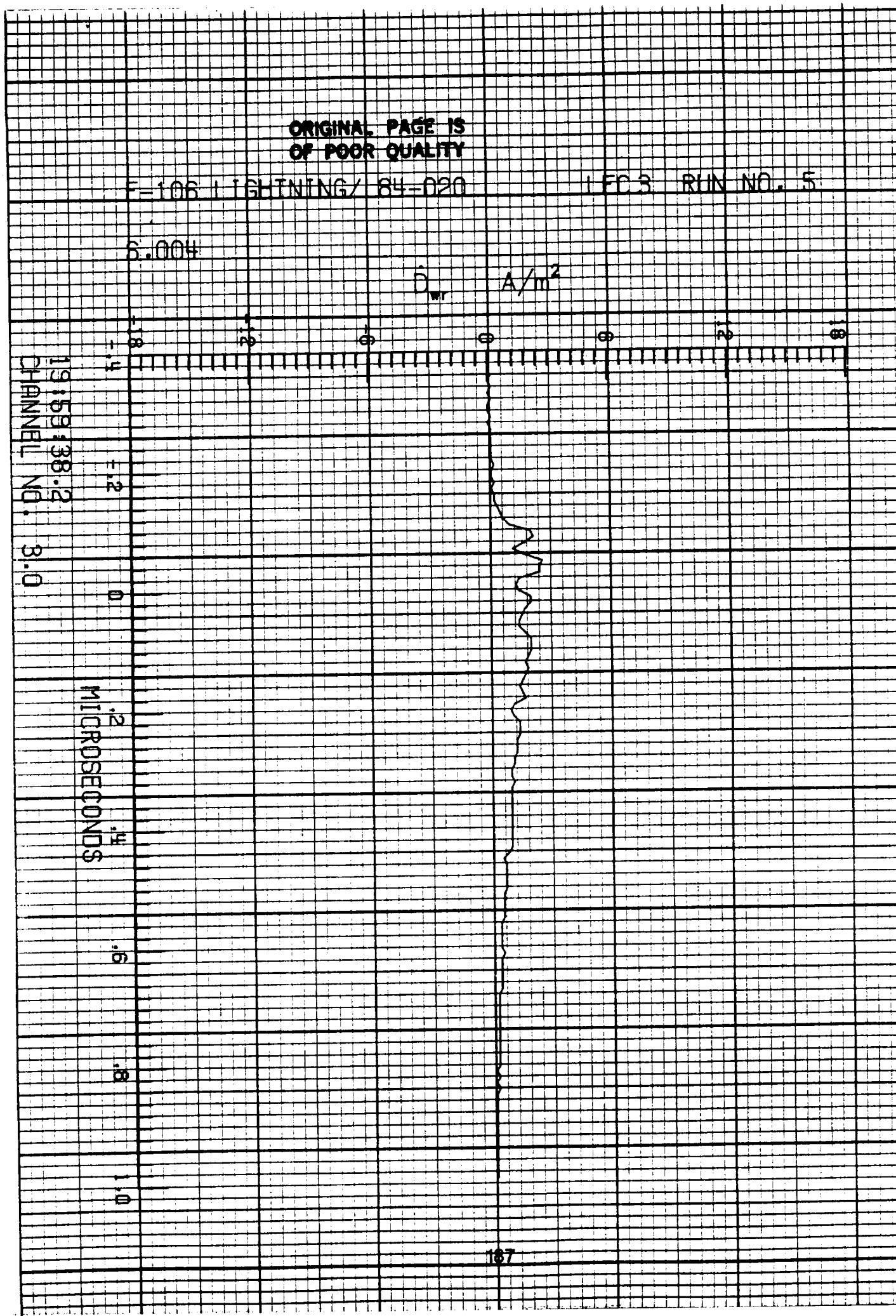

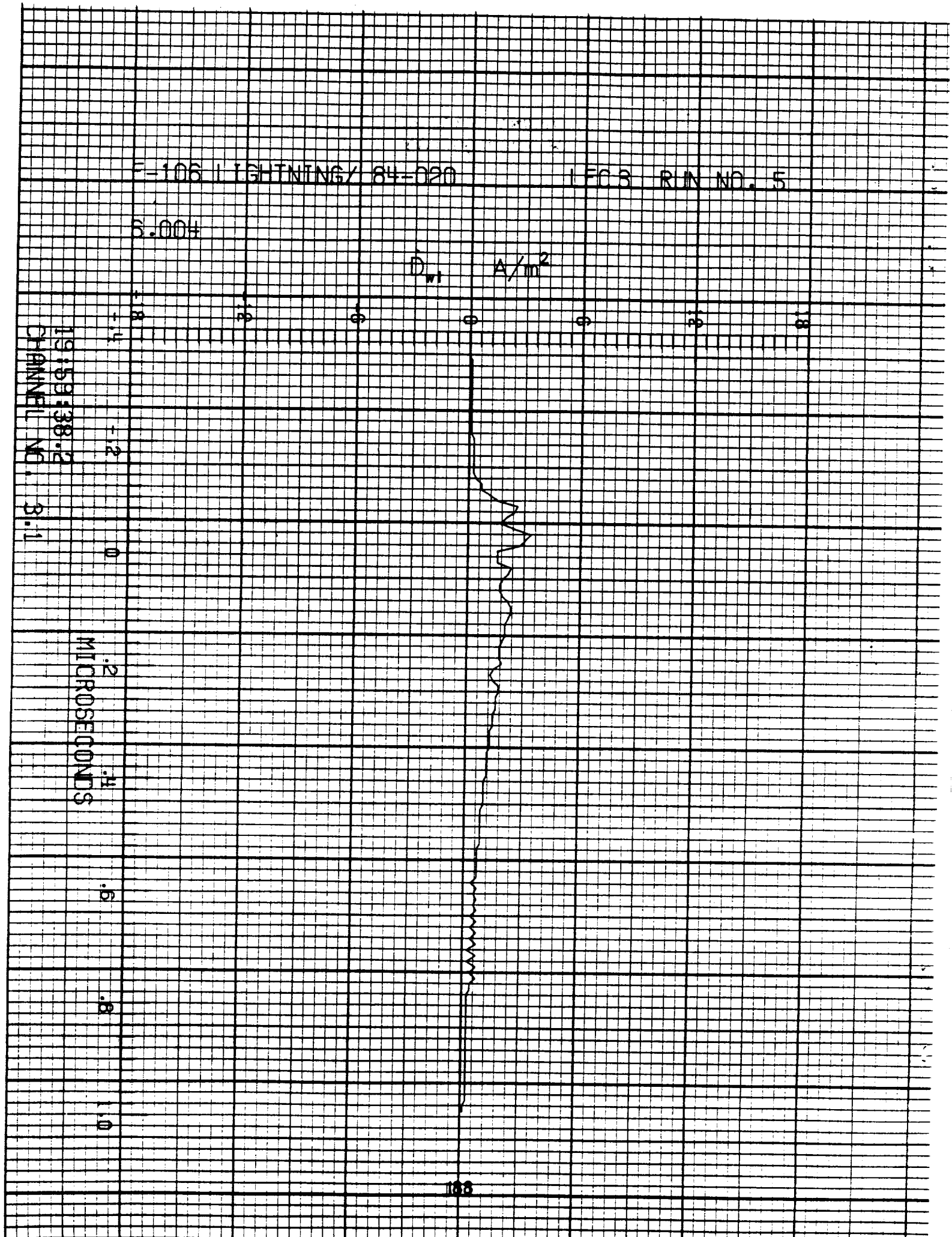
F-106 LIGHTNING/ 84-020
LFC 3 RUN NO. 5
6.004
$\dot{D}_{wi}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:59:38.2
CHANNEL NO. 3.1

ORIGINAL PAGE IS
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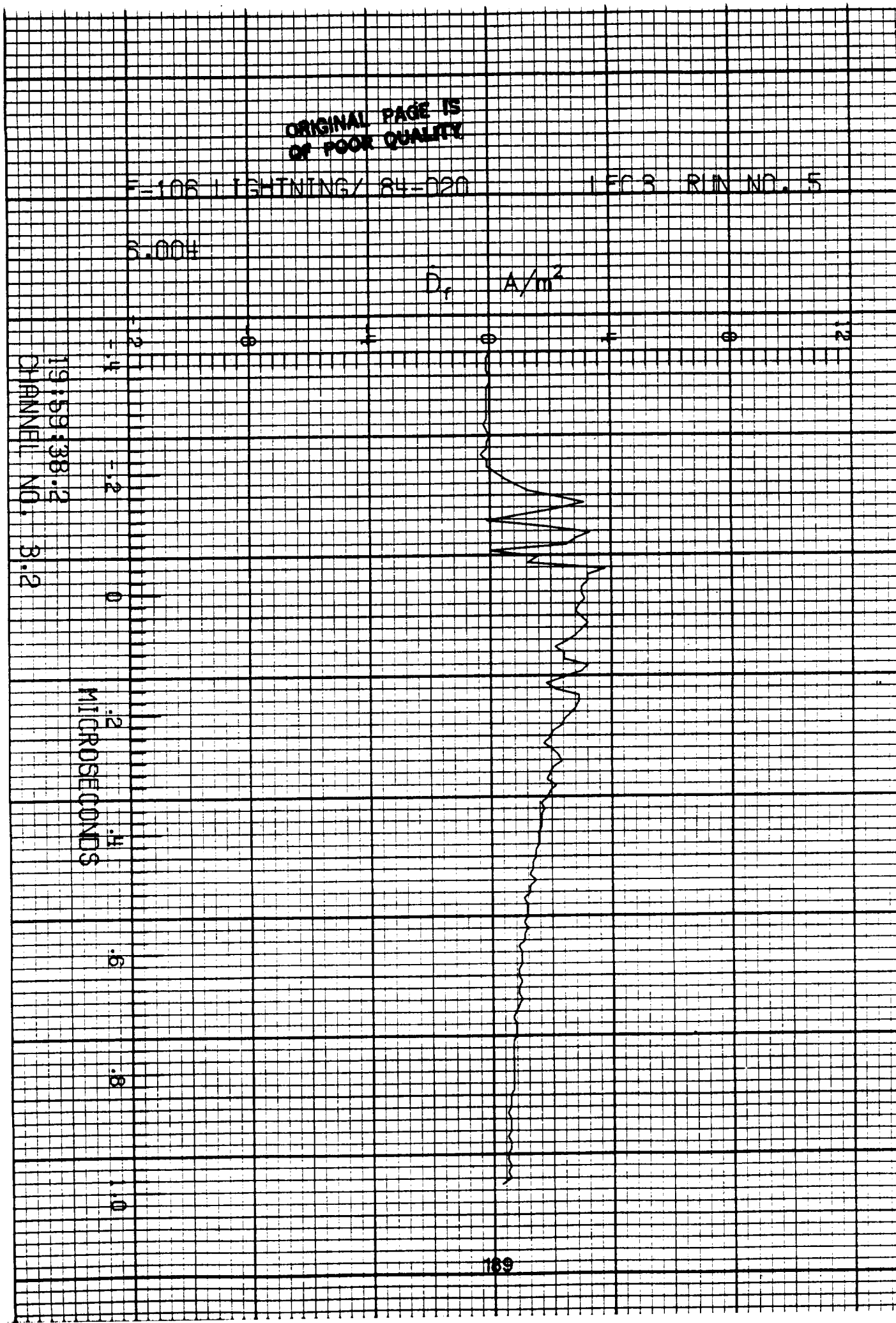

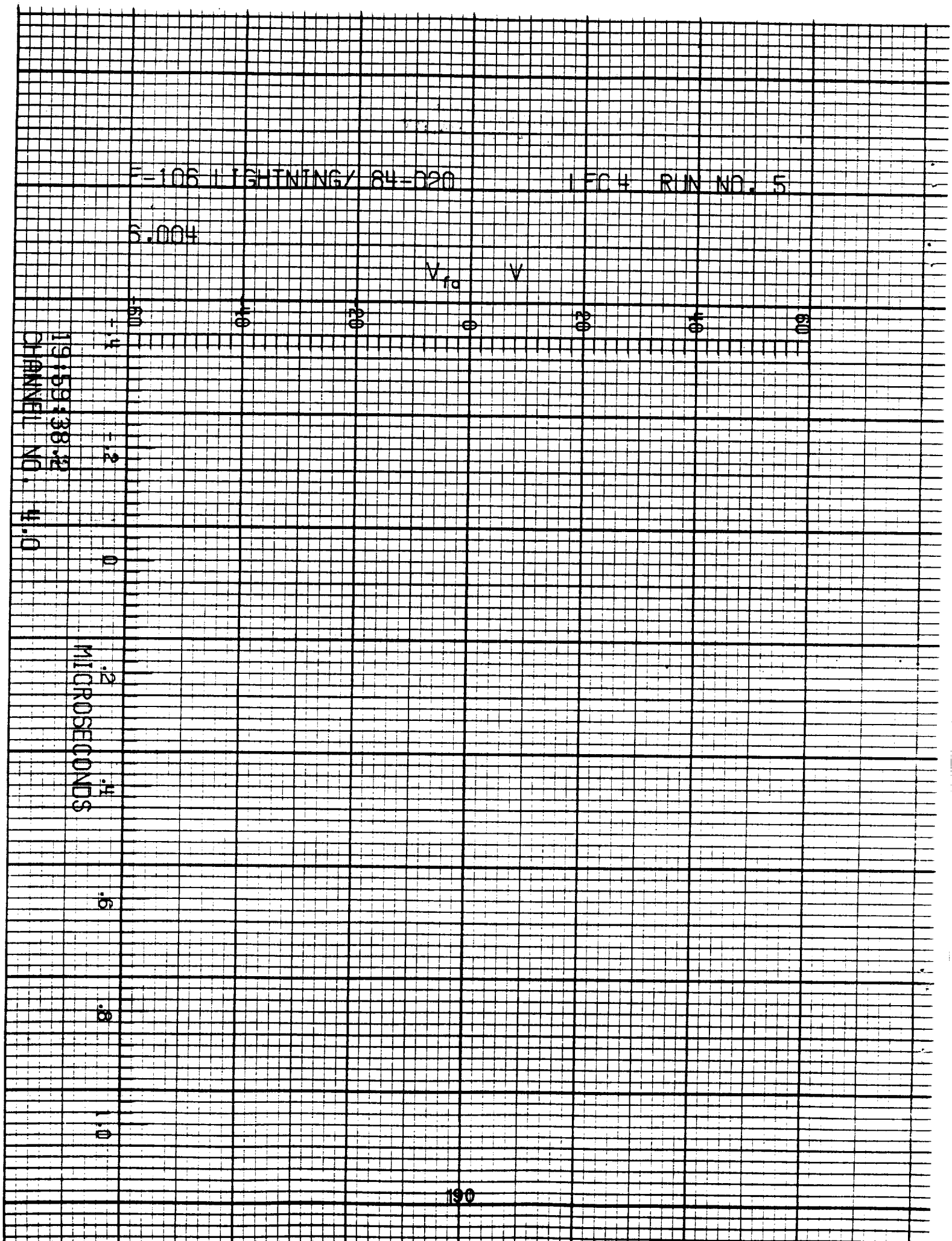
F-106 LIGHTNING/ 84-020
LEC 4 RUN NO. 5
6.004
V_{fa} V
-60
-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:59:38.2
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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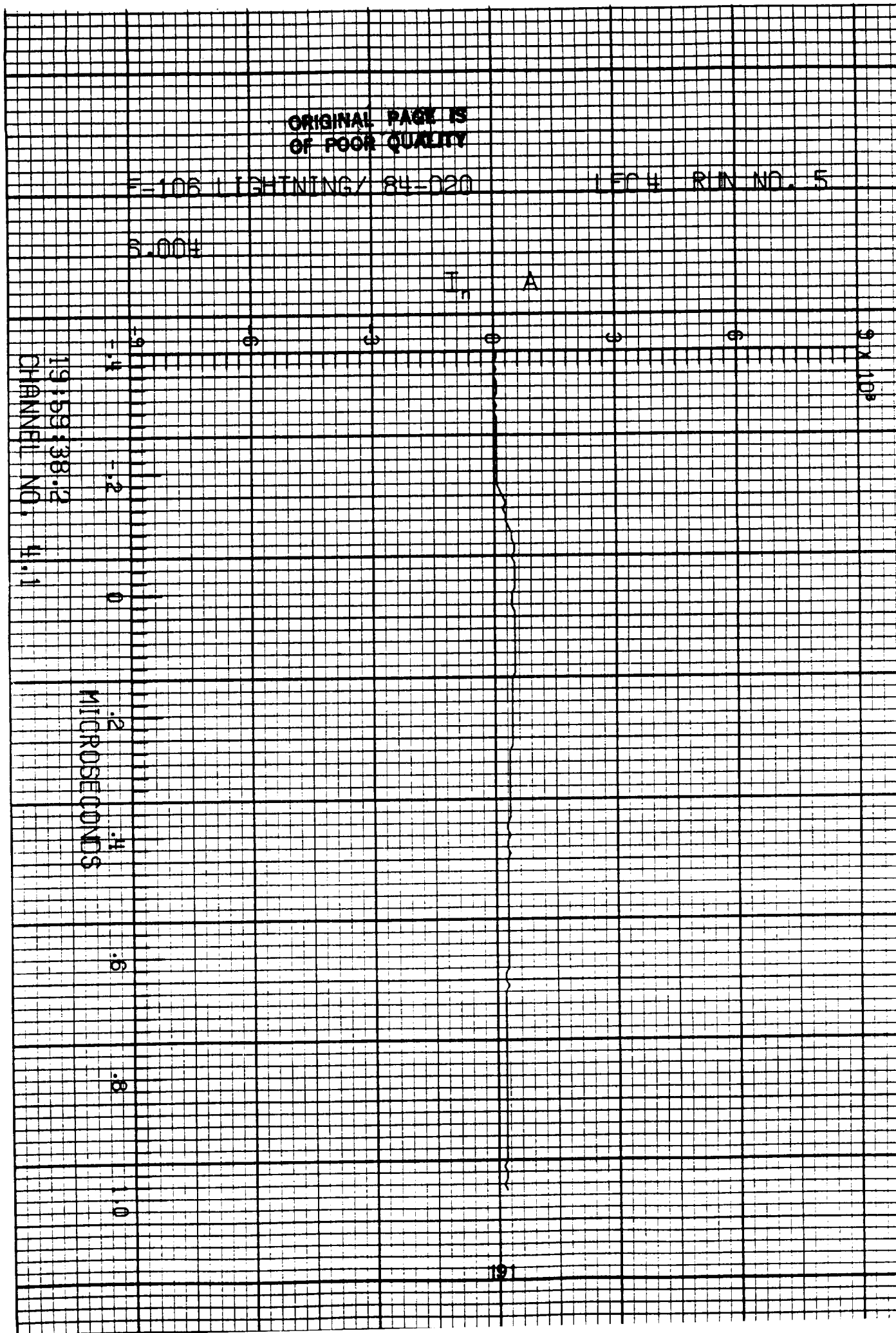

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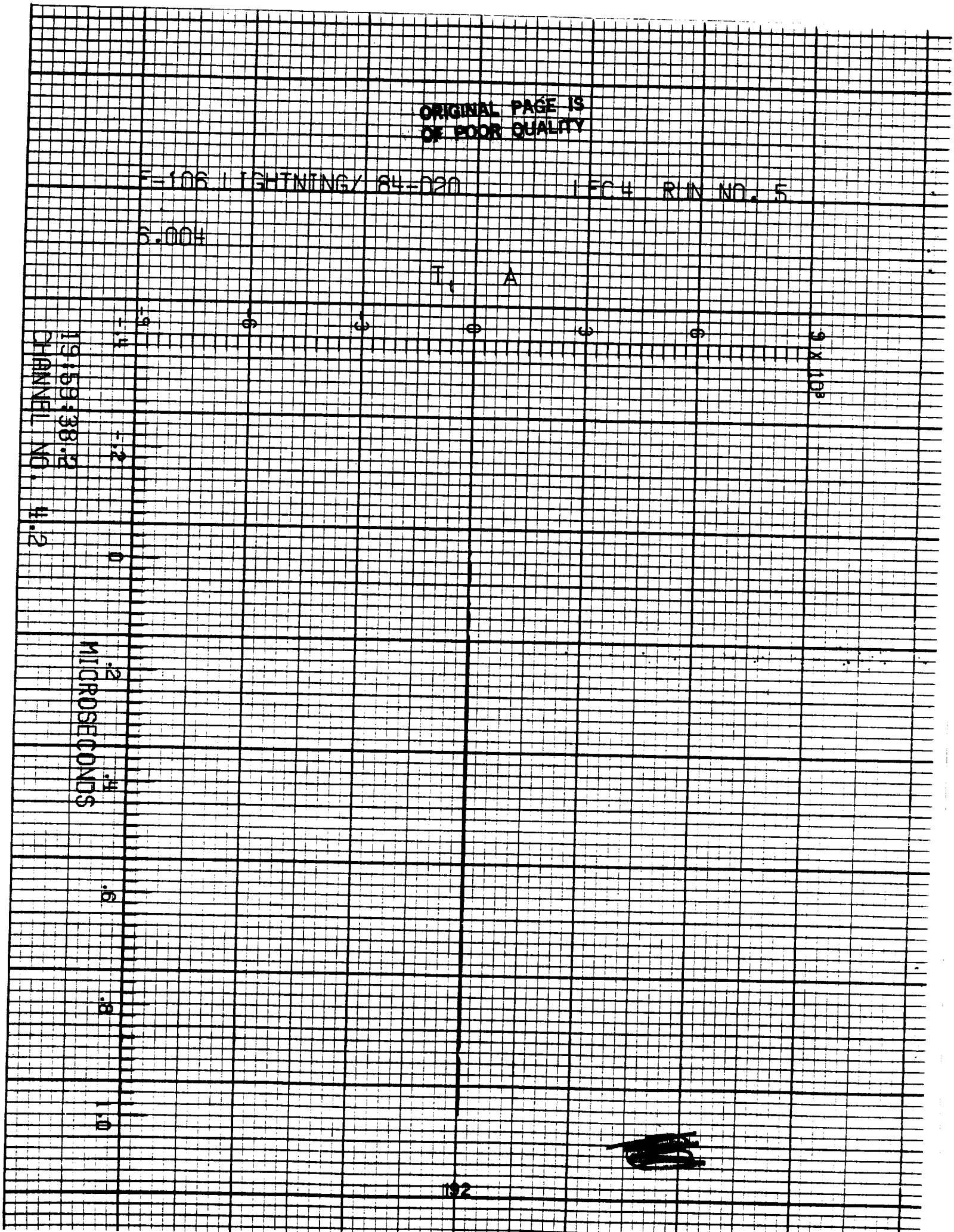

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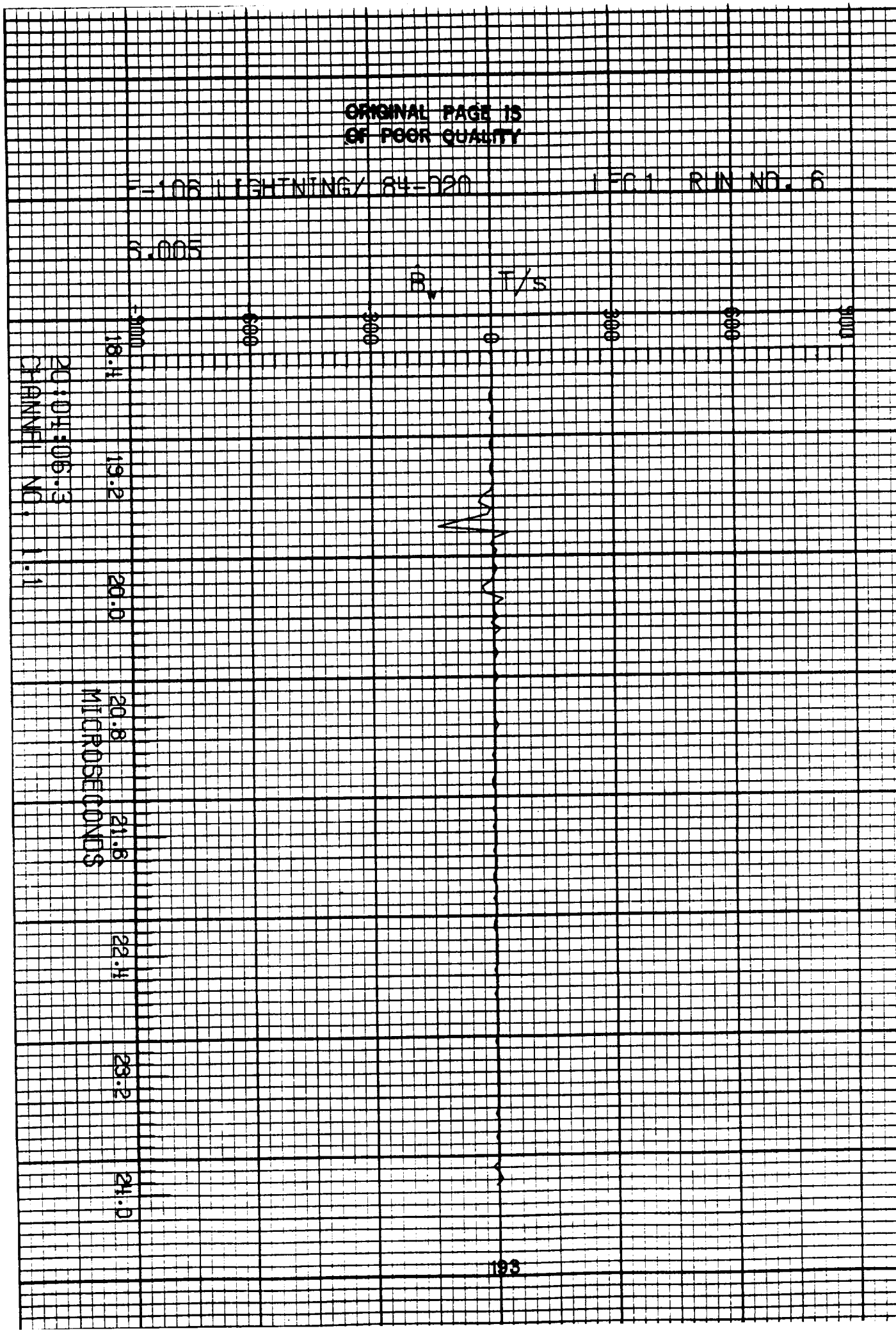

F-106 LIGHTNING/ 84-020 LEC 1 RUN NO. 6

S.005

$\dot{B}_w$ T/s

-400 -300 -200 -100 0 100 200 300 400

18.4 19.2 20.0 20.8 21.6 22.4 23.2 24.0

MICROSECONDS

20:04:06.3

CHANNEL NO. 1.2

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F-106 LIGHTNING/ 84-020 LFC 2 RUN NO. 6

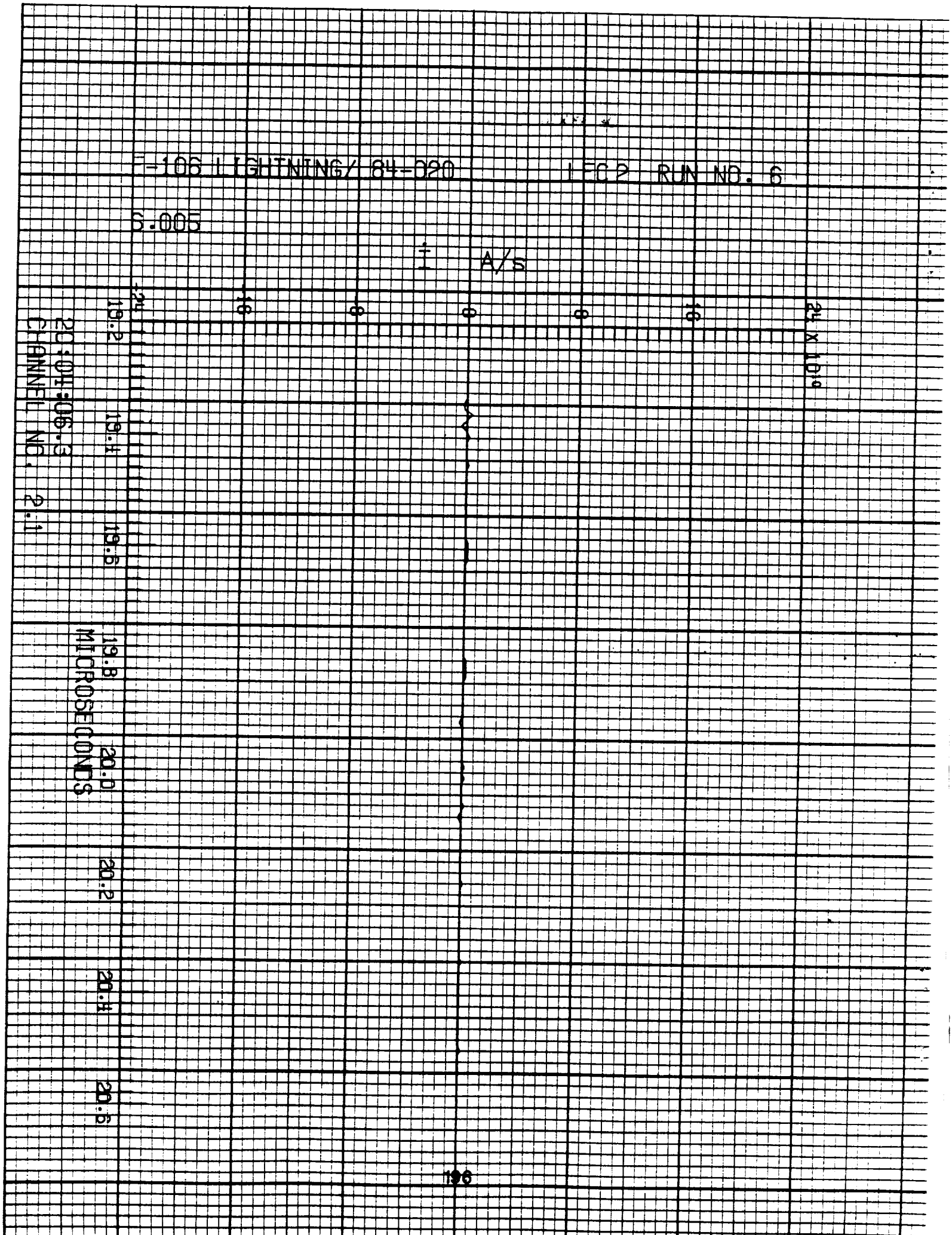
6.005

j_t A/m^2

19.2 19.4 19.6 19.8 20.0 20.2 20.4 20.6

MICROSECONDS

20:04:06.3
CHANNEL NO. 2.0


F-106 LIGHTNING/ 84-020
LEC2 RUN NO. 6
6.005
A/s
-24
-16
-8
0
8
16
24 x 10^10
19.2
19.4
19.6
19.8
20.0
20.2
20.4
20.6
MICROSECONDS
20:04:06.3
CHANNEL NO. 2.1

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T=106 LIGHTNING/ 84-320 1 FC 2 RUN NO. 6

6.005

$\dot{B}_1$ T/s

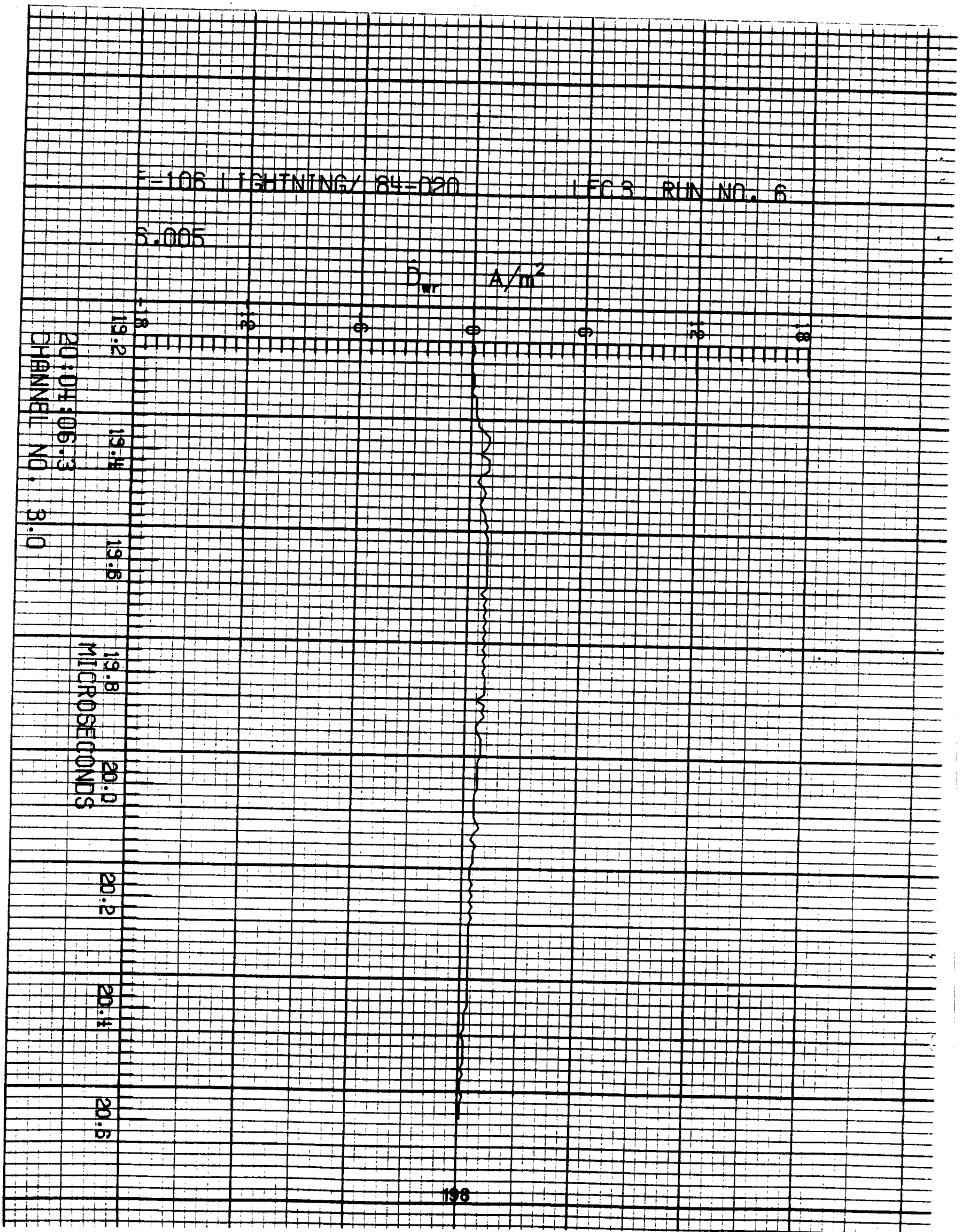
-1800 -1200 -600 0 600 1200 1800

19.2 19.4 19.6 19.8 20.0 20.2 20.4 20.6

20:04:06.3

CHANNEL NO. 2.2

MICROSECONDS


F=106 LIGHTNING/ 84-020
LFC3 RUN NO. 6
6.005
$\hat{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
19.2
19.4
19.6
19.8
20.0
20.2
20.4
20.6
MICROSECONDS
20:04:06.3
CHANNEL NO. 3.0

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-020 IFC 3 RUN NO. 6

6.005

$\dot{D}_{w1}$ A/m^2

-.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

19.2 19.4 19.6 19.8 20.0 20.2 20.4 20.6

MICROSECONDS

20:04:06.3

CHANNEL NO.: 3:1

F-106 LIGHTNING/ 84-020
FC3 RUN NO. 6
6.005
$\dot{D}_f$ A/m^2
-12
0
+
0
+
0
12
19.2
19.4
19.6
19.8
20.0
20.2
20.4
20.6
MICROSECONDS
20:04:06.3
CHANNEL NO. 3.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-020 LEC 4 RUN NO. 6

5.005

V_{fa} V

-60 -40 -20 0 20 40 60

19.2
19.4
19.6
19.8
20.0
20.2
20.4
20.6

20:04:06.3
CHANNEL NO. 4.0

MICROSECONDS

C-3

F-106 LIGHTNING/ 84-020 IFC4 RUN NO. 6

6.005

I_n A

9x10³

19.2

19.4

19.6

19.8

20.0

20.2

20.4

20.6

MICROSECONDS

20:04:06.13

CHANNEL NO. #1

ORIGINAL PAGE IS
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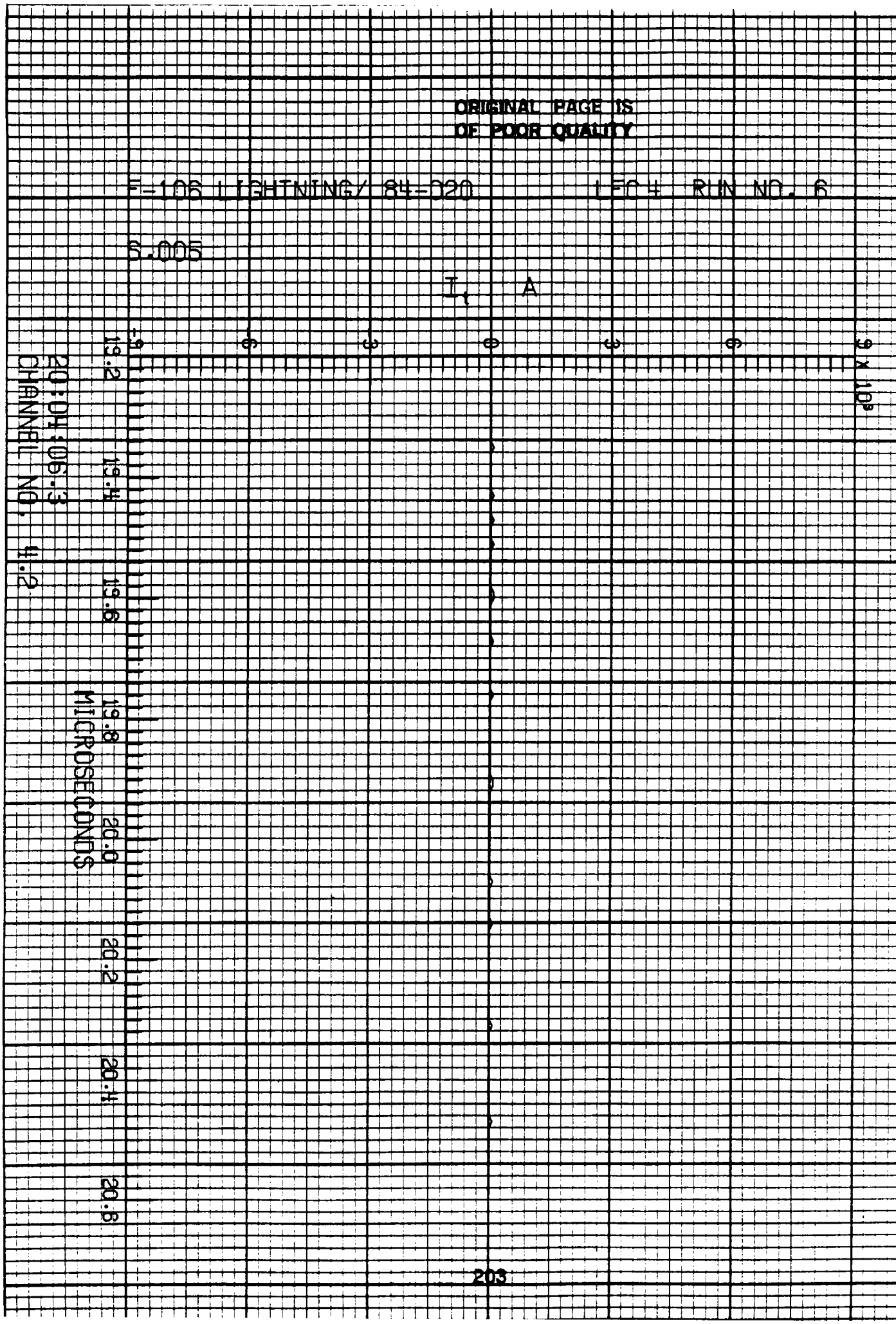

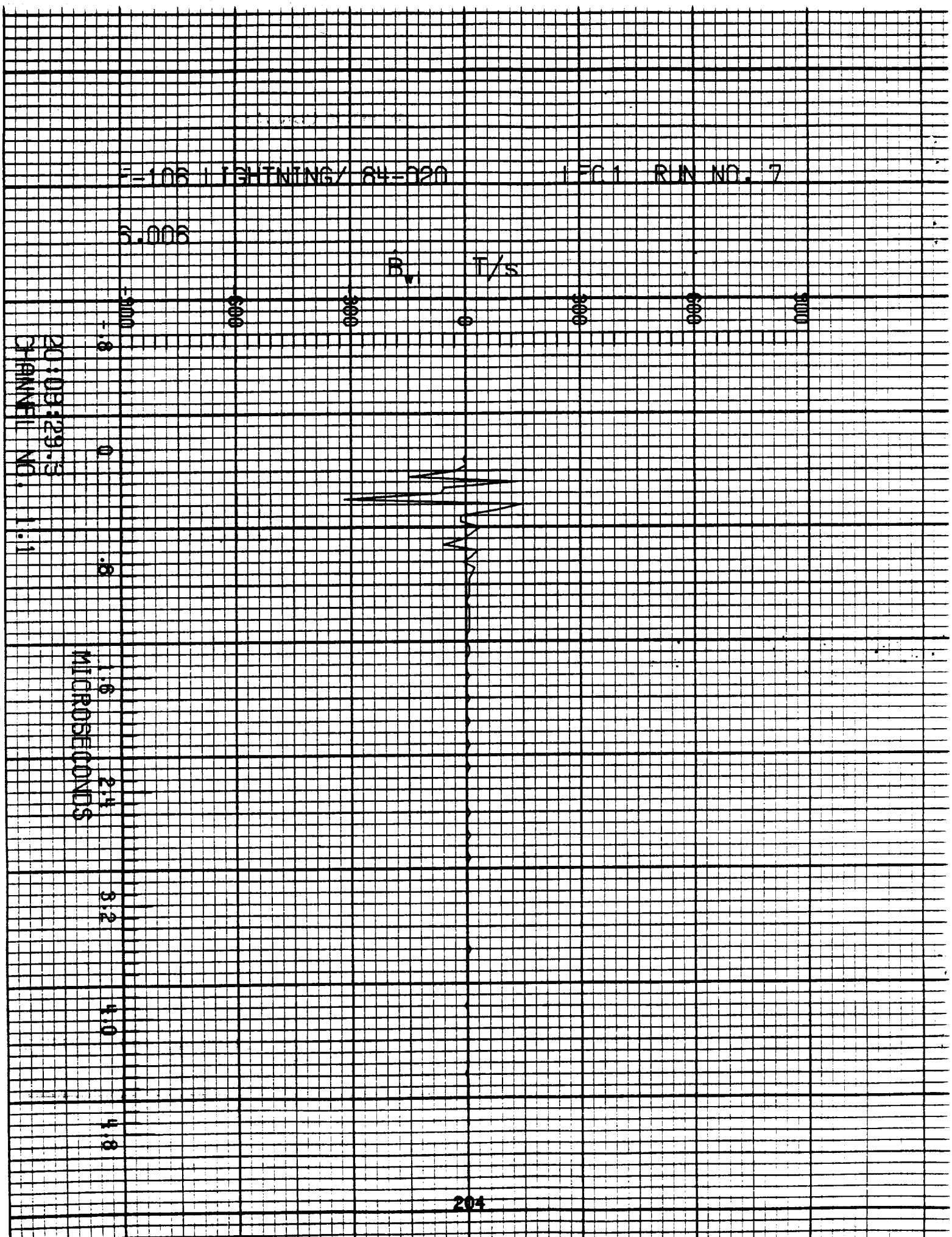
F-106 LIGHTNING/ 84-020
LFC1 RUN NO. 7
6.006
$\hat{B}_{w1}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
20:09:29.3
CHANNEL NO. 1:1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-020 LFC.1 RUN NO. 7

6.006

$\dot{B}_{wr}$ T/s

-800 -600 -400 -200 0 200 400 600 800

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

20:09:29.3
CHANNEL NO. 1:2

MICROSECONDS

F-106 LIGHTNING/ 84-020 IFCP RUN NO. 7

6.006

D_t A/m^2

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:09:29.3 CHANNEL NO. 2

ORIGINAL PAGE IS
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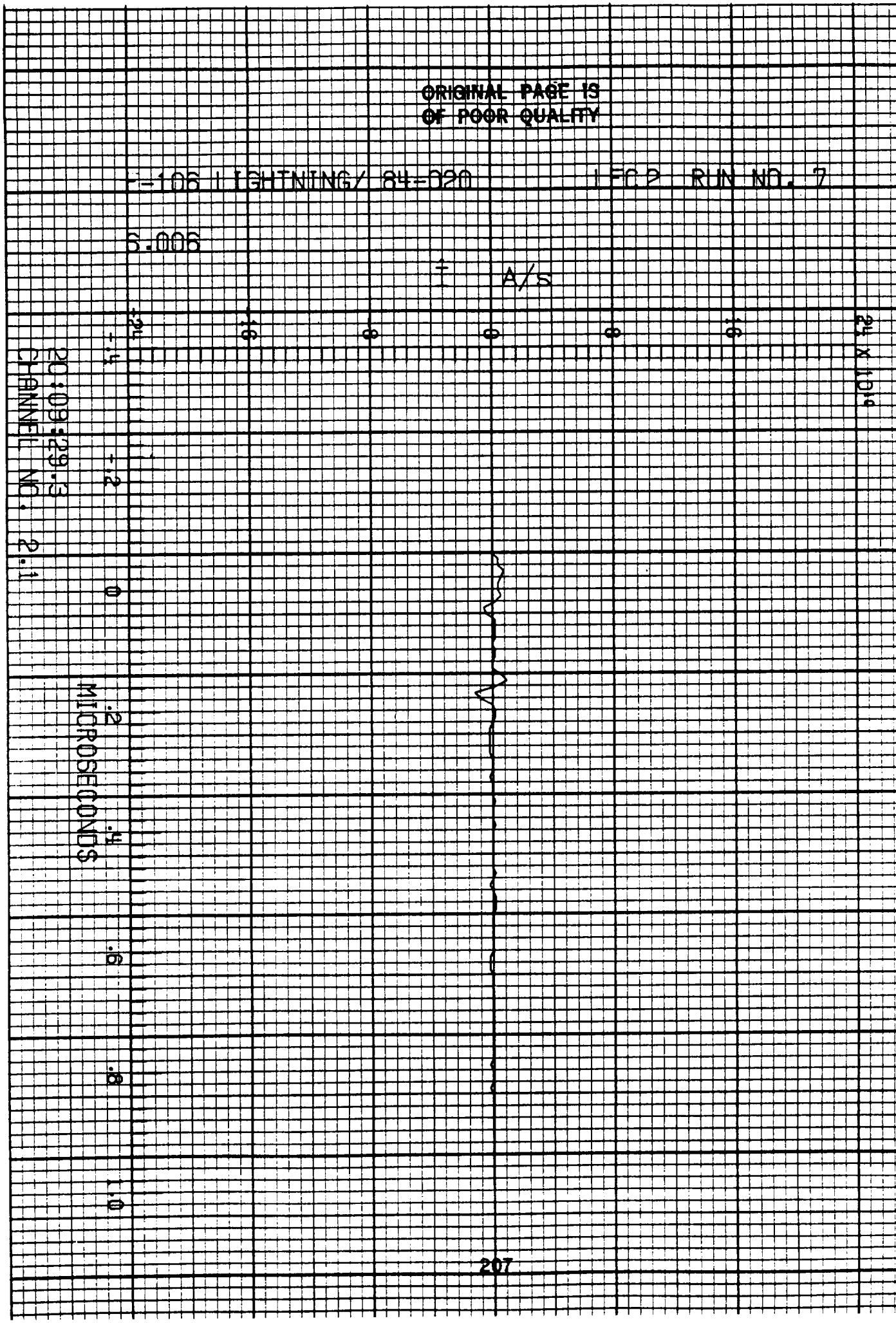


F-106 LIGHTNING/ 84-020 LFC-2 RUN NO. 7

6.006

B_1 T/s

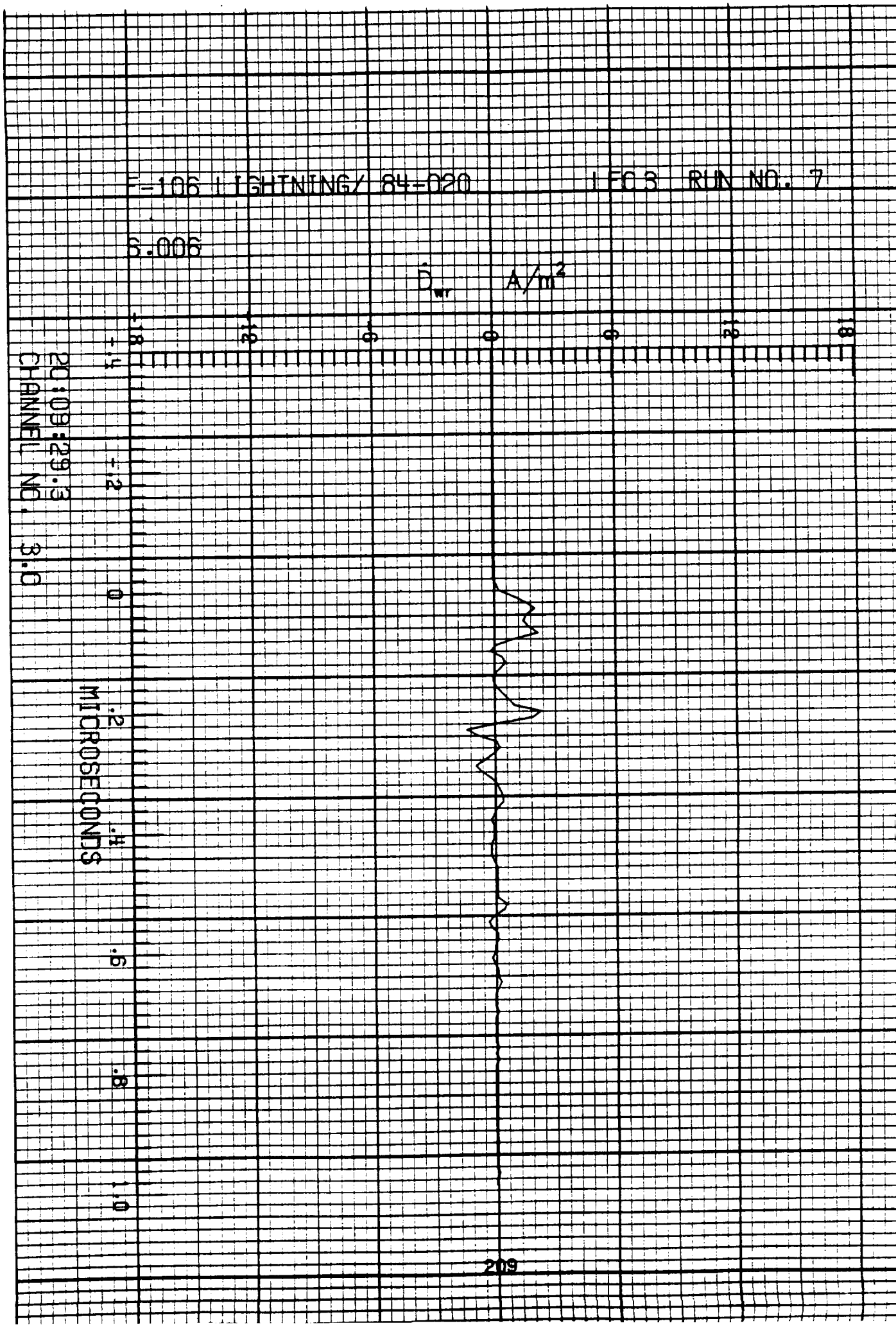
-1800 -1200 -600 0 600 1200 1800

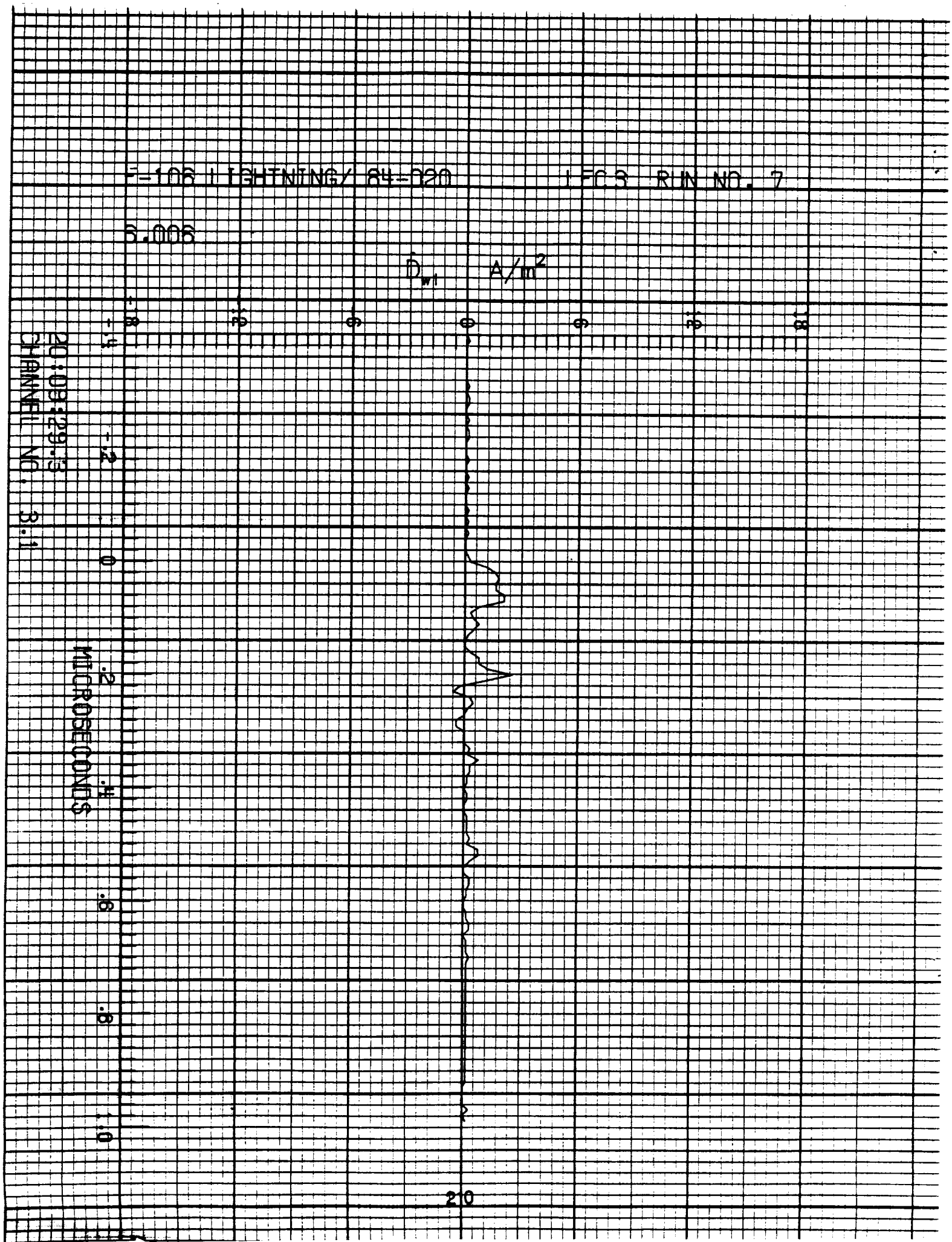
-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

20:06:29.3

CHANNEL NO: 2:2


F-106 LIGHTNING/ 84-020
LFC 3 RUN NO. 7
6.006
$\dot{D}_{wr}$ A/m²
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:09:29.3
CHANNEL NO. 3.0


F-106 LIGHTNING/ 84-020
LFC3 RUN NO. 7
6.006
$\dot{D}_{w1}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:09:29.3
CHANNEL NO. 3.1

ORIGINAL PAGE IS
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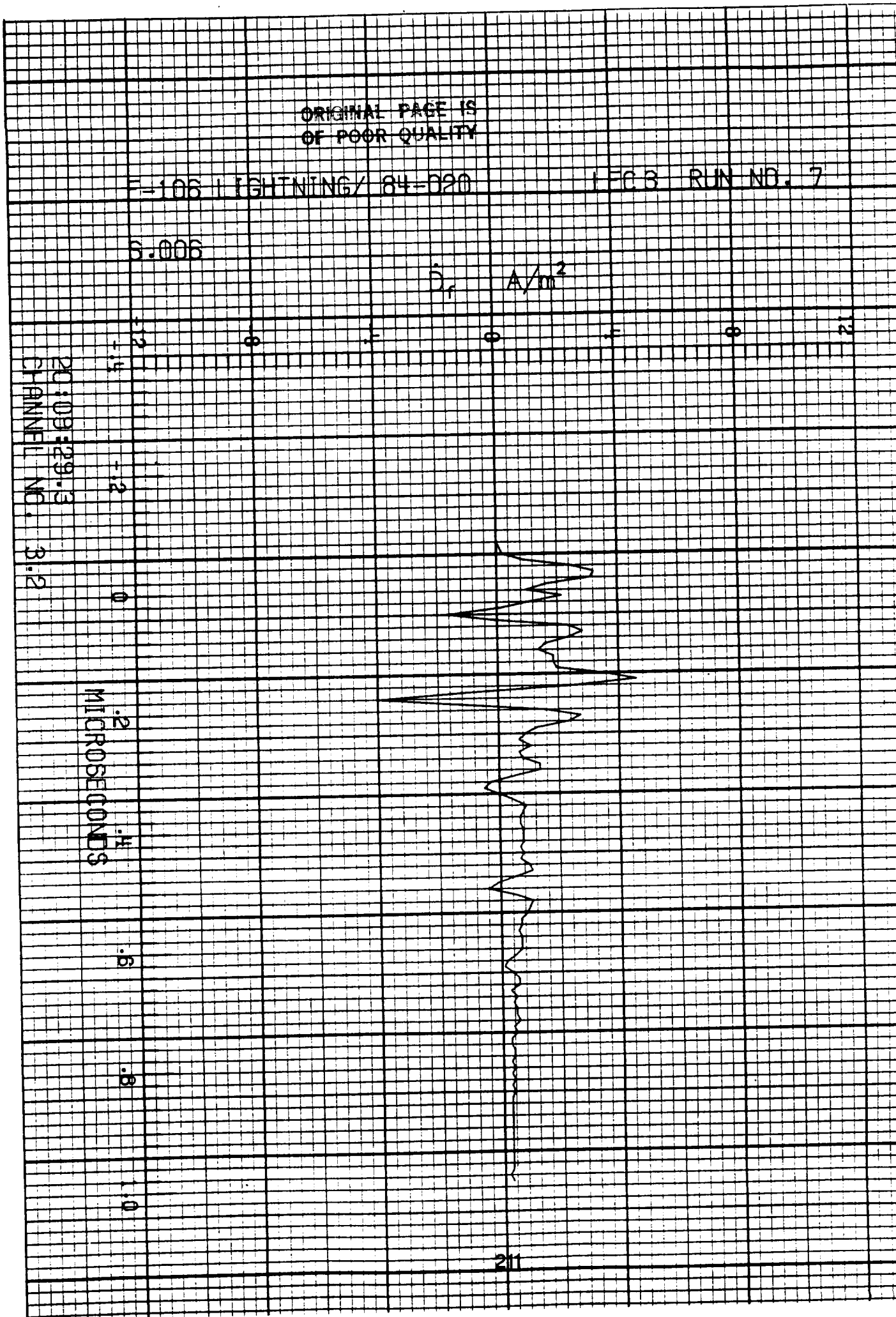

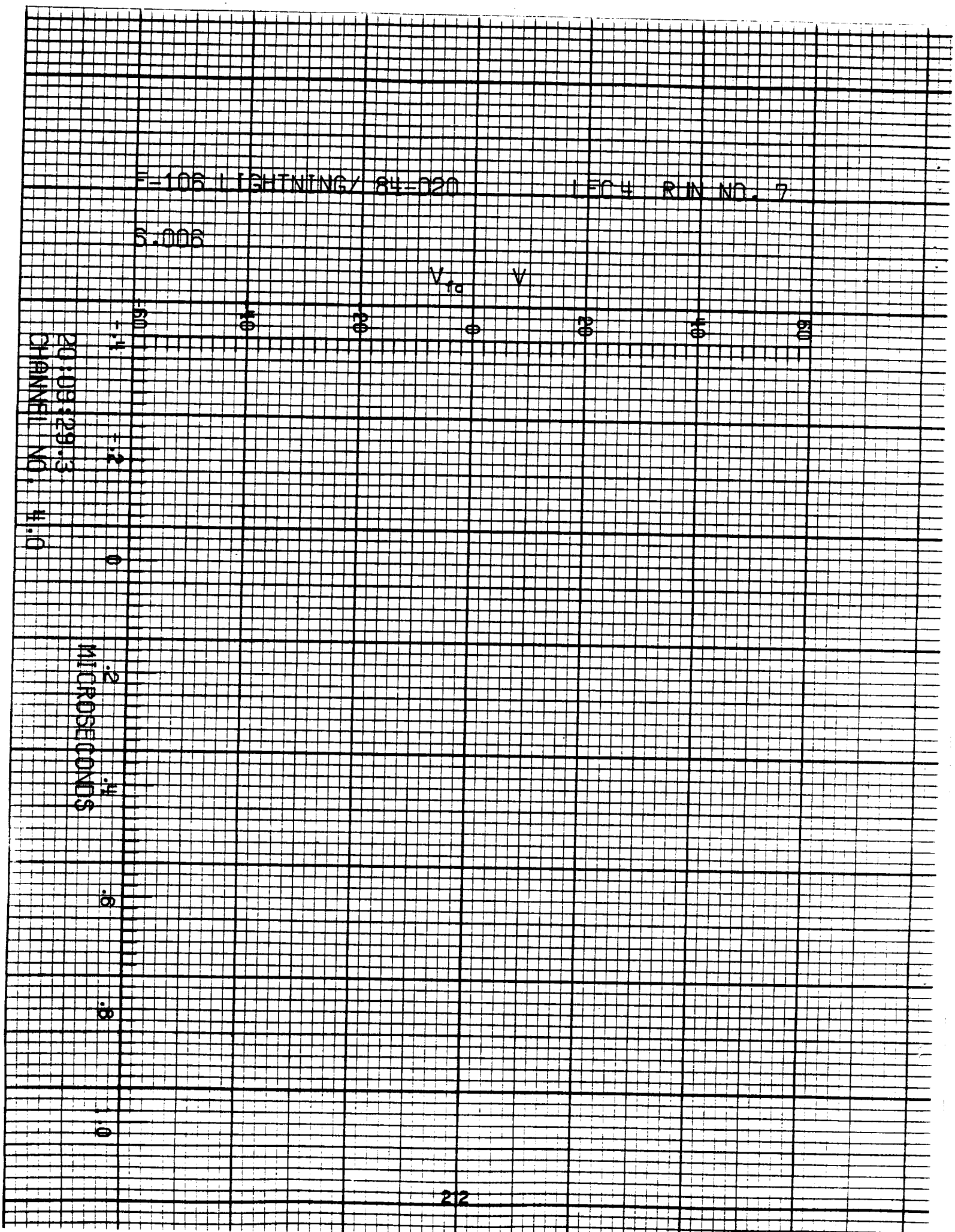
F-106 LIGHTNING/ 84-020
LEC4 RUN NO. 7
6.006
V_{fa} V
-60
-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:09:29.3
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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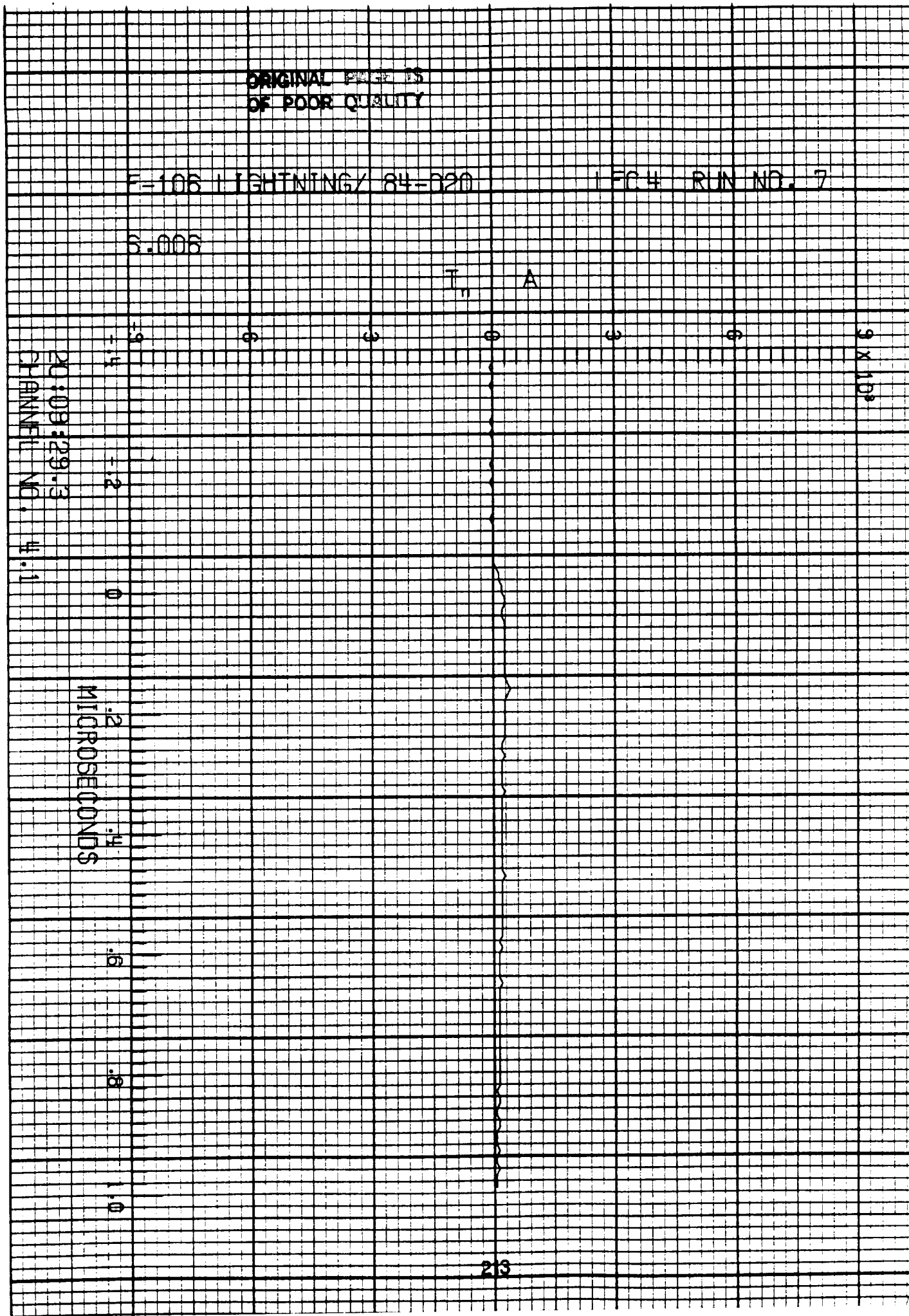
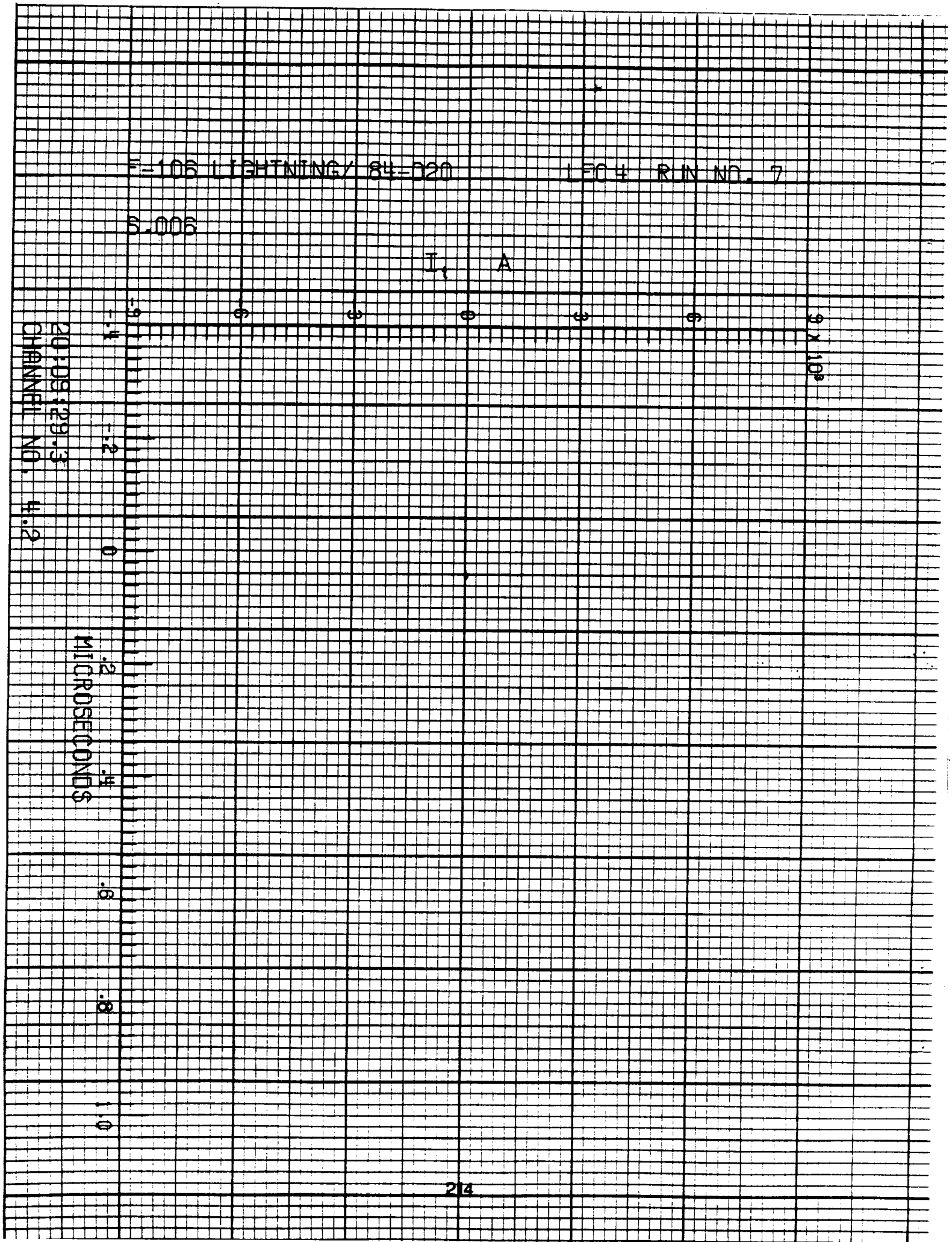
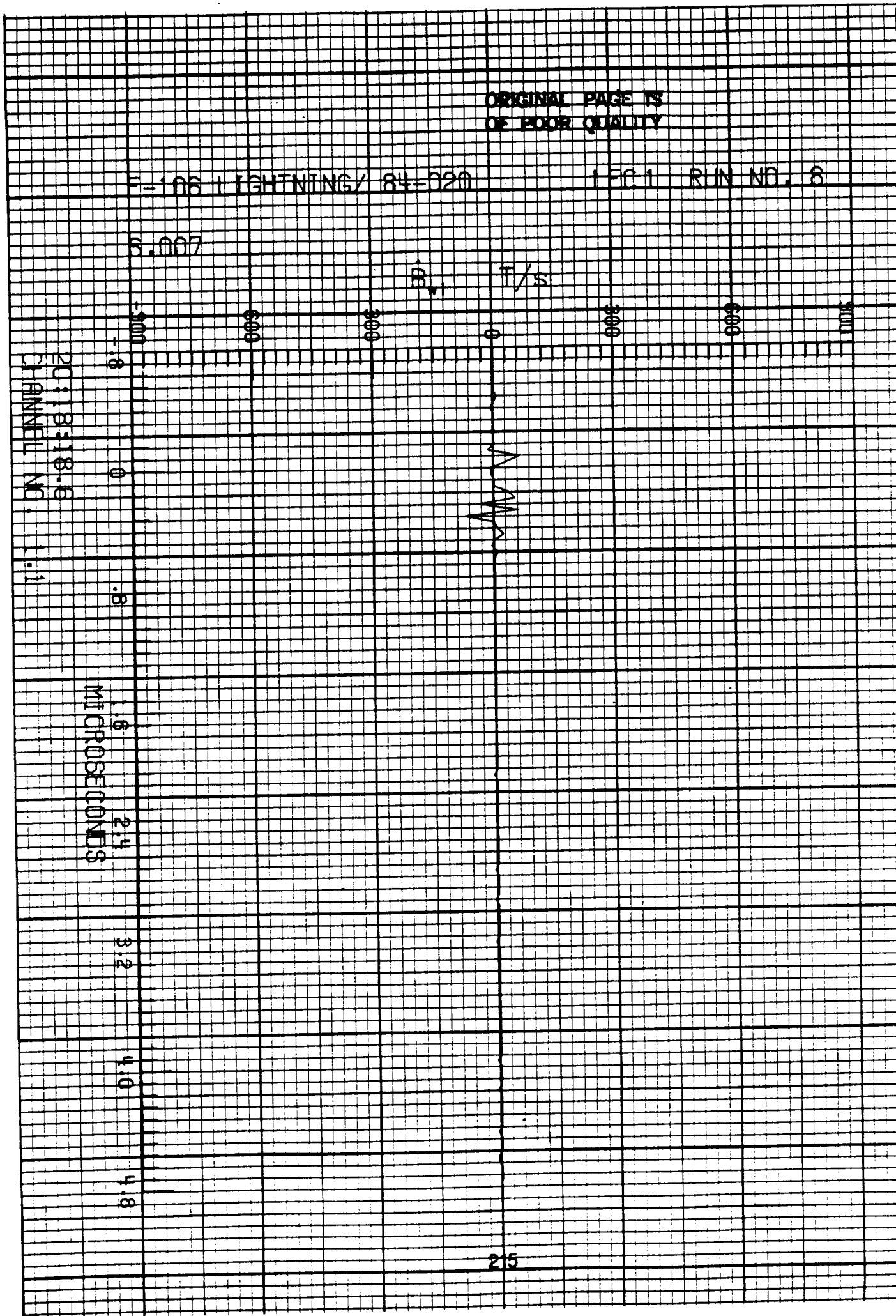
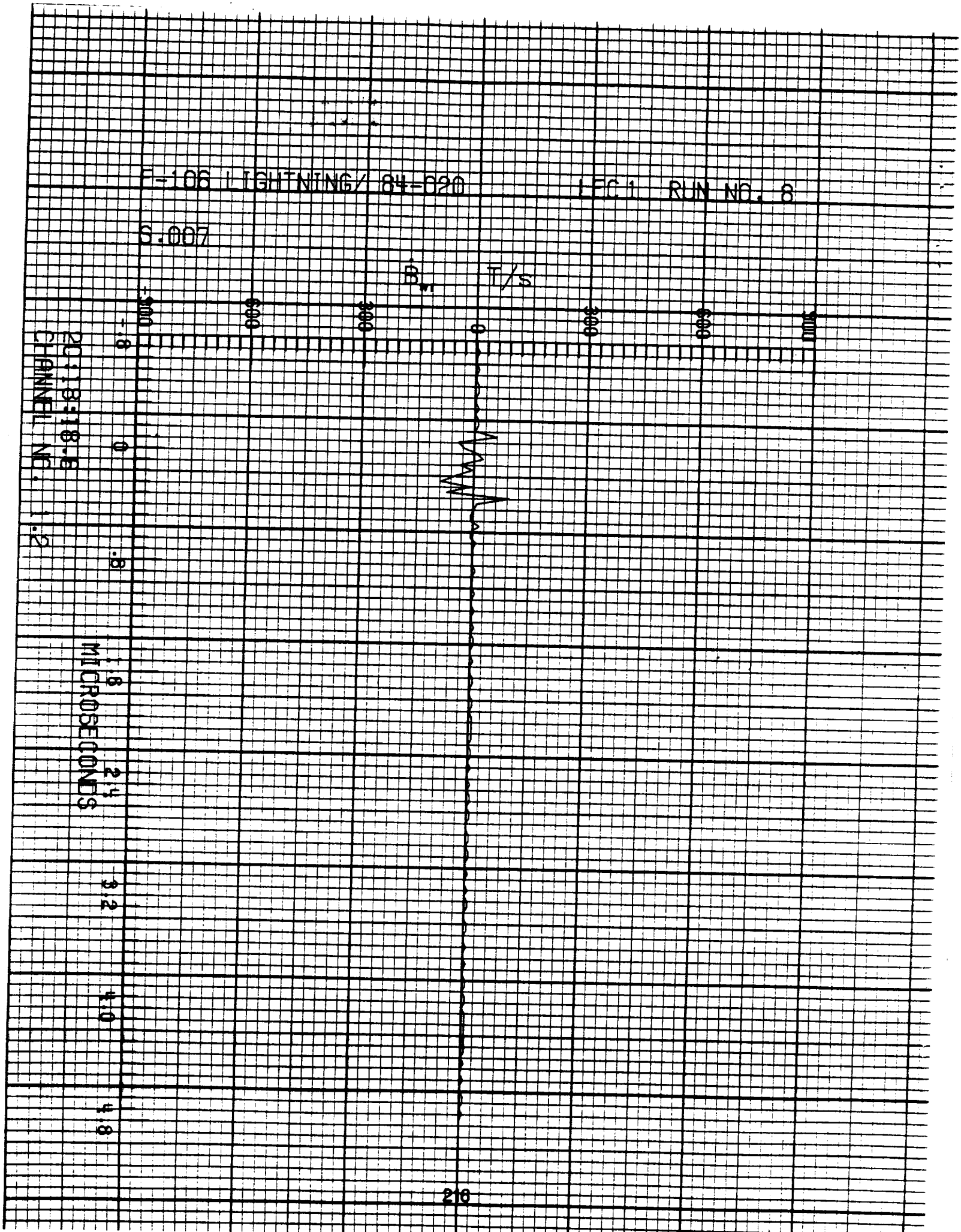



F-106 LIGHTNING/ 84-020
LEC 4 RUN NO. 7
6.006
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:09:29.3
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-020
LFC1 RUN NO. 8
S.007
$\hat{B}_{wr}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
20:18:18.6
CHANNEL NO. 1.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-020 KSC 2 RUN NO. 8

6.007

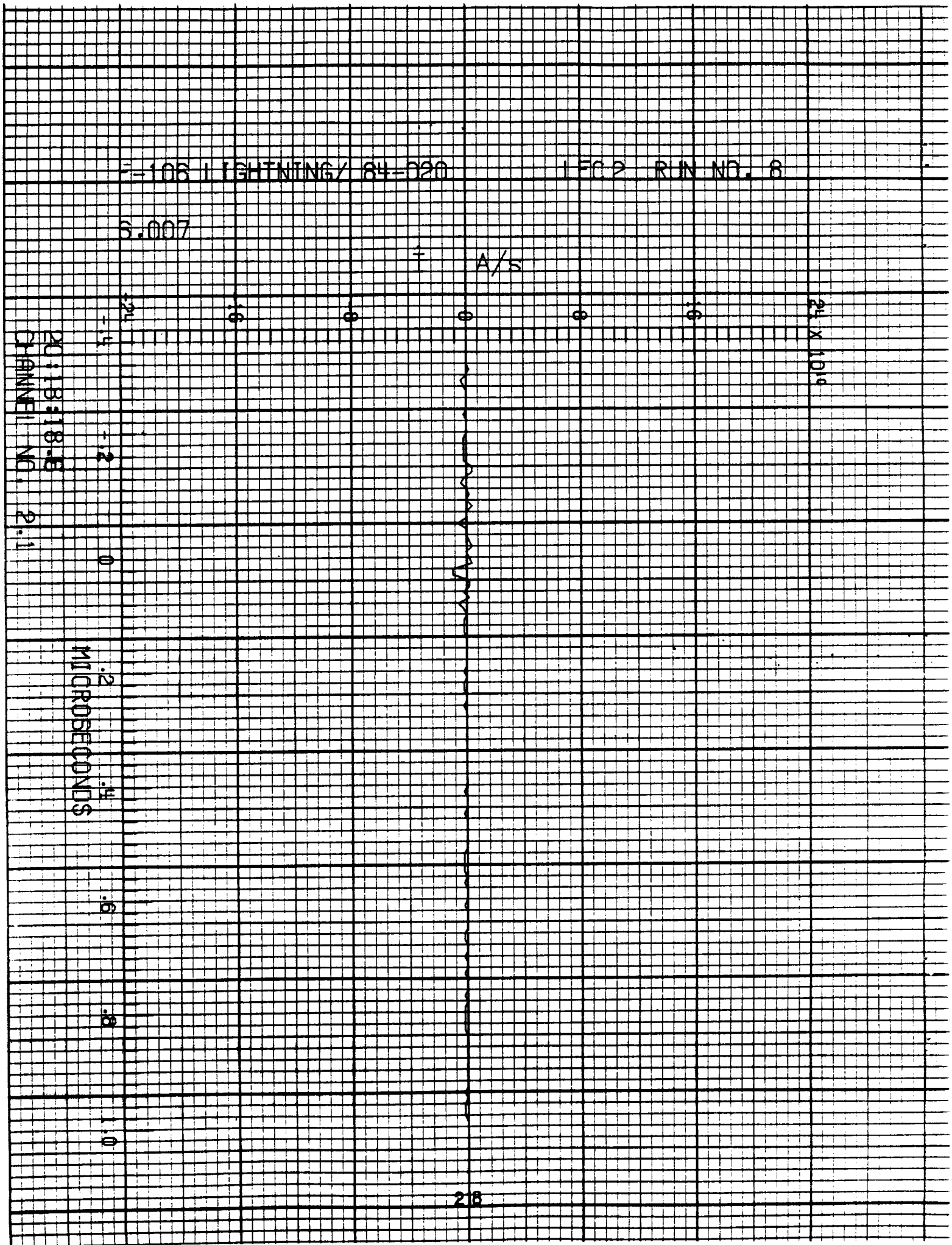
D_t A/m^2

-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:18:18.6
CHANNEL NO. 2.0


F-106 LIGHTNING/ 84-020
LFC2 RUN NO. 8
6.007
Ṫ A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:18:18.6
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

F=106 LIGHTNING/ 84-320 LEC 2 RUN NO. 8

6.007

B_1 T/s

-1800 -1200 -600 0 600 1200 1800

20:18:18.6
CHANNEL NO. 2.2

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

F-106 LIGHTNING/ 84-020 IFC B RUN NO. 8

8.007

$\dot{D}_{wr}$ A/m^2

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

CHANNEL NO. 8.0 20:18:18.6

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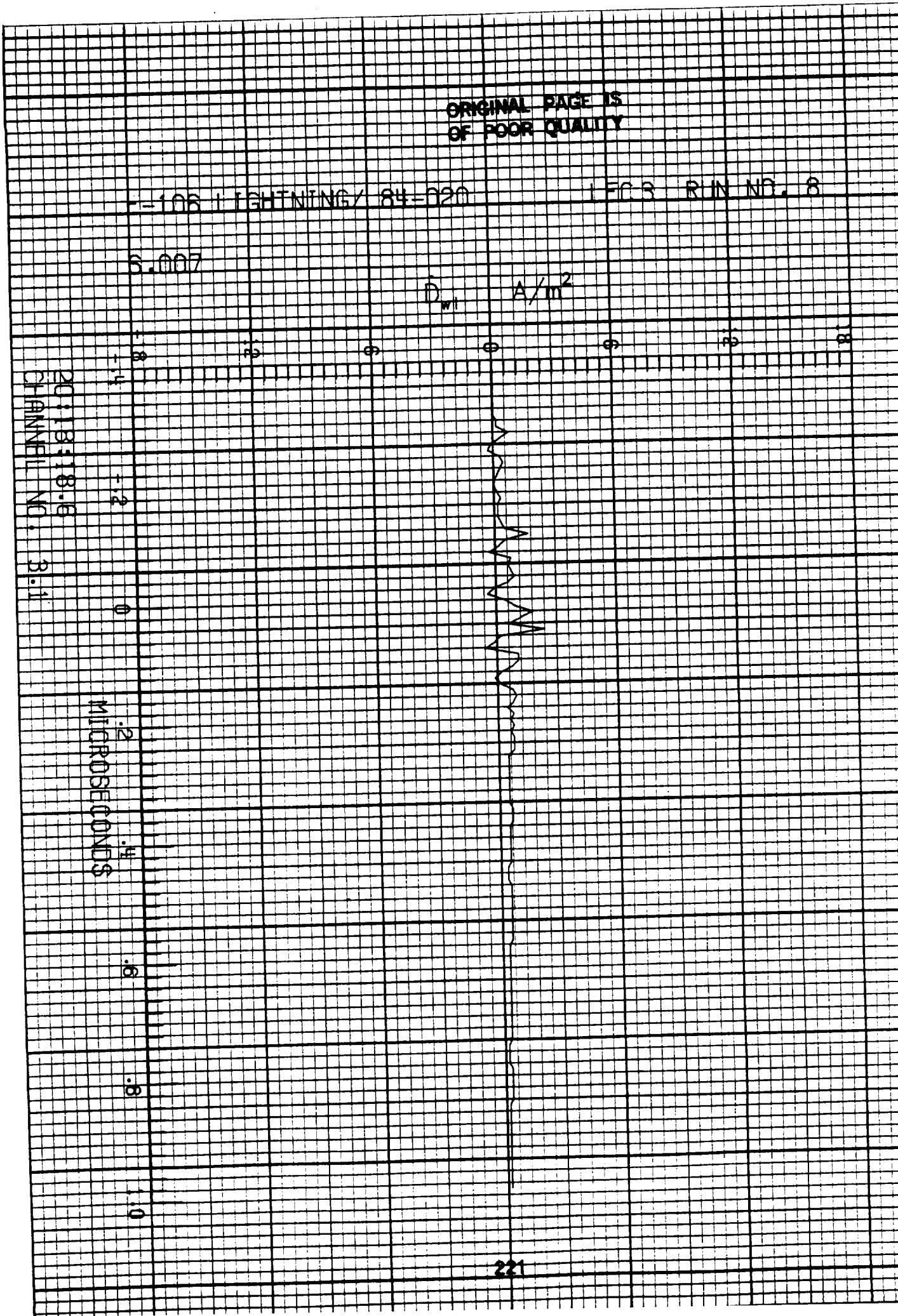
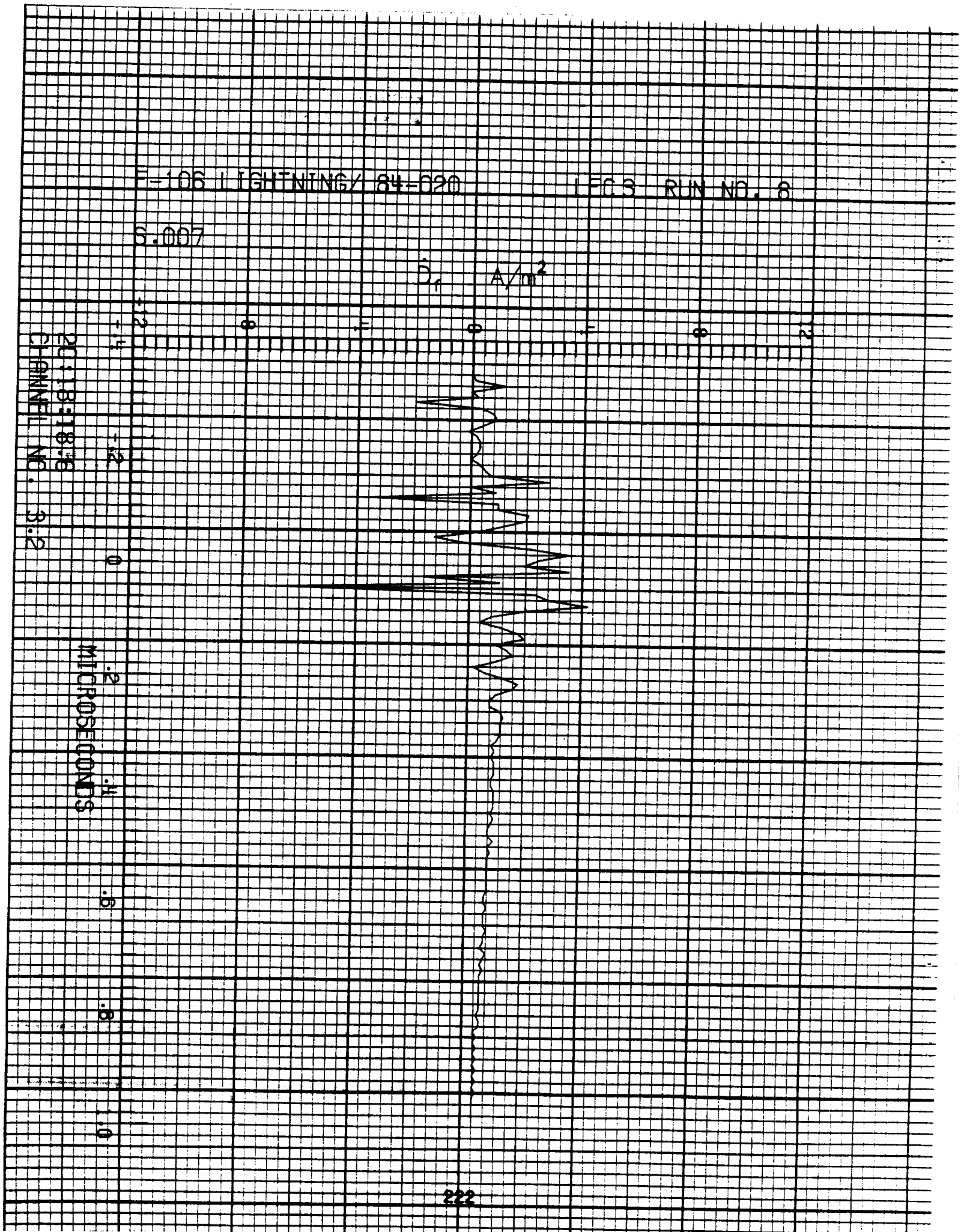
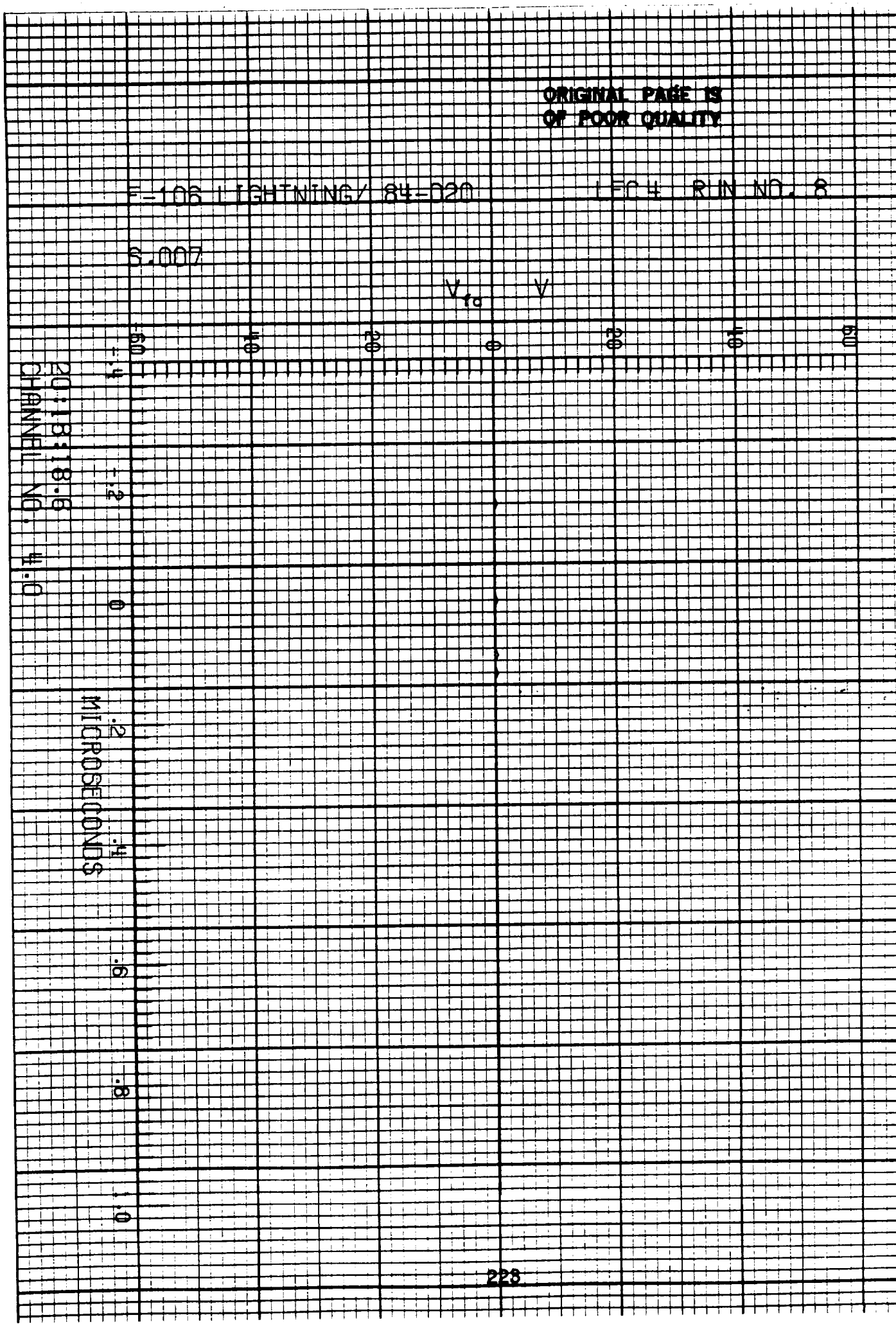
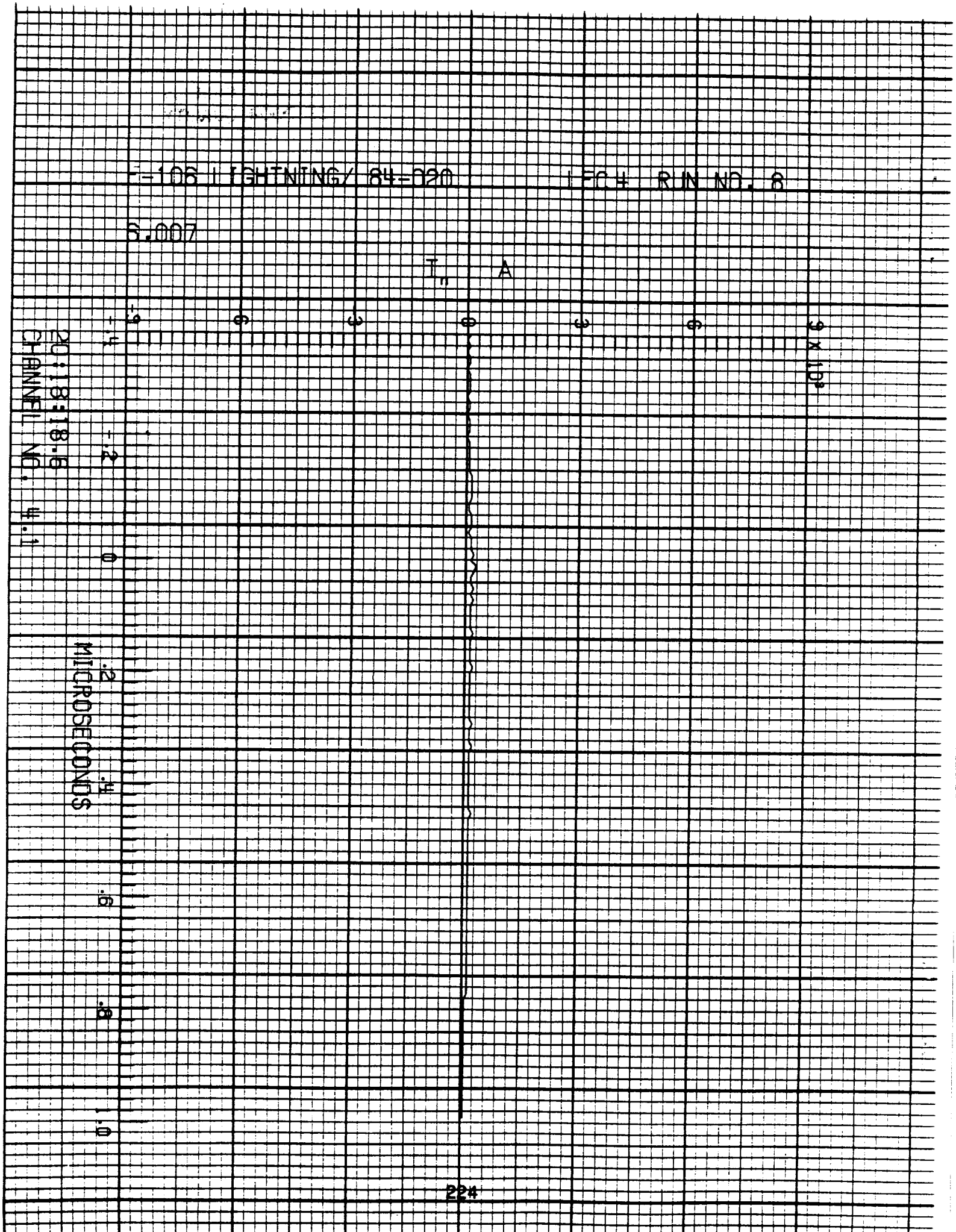


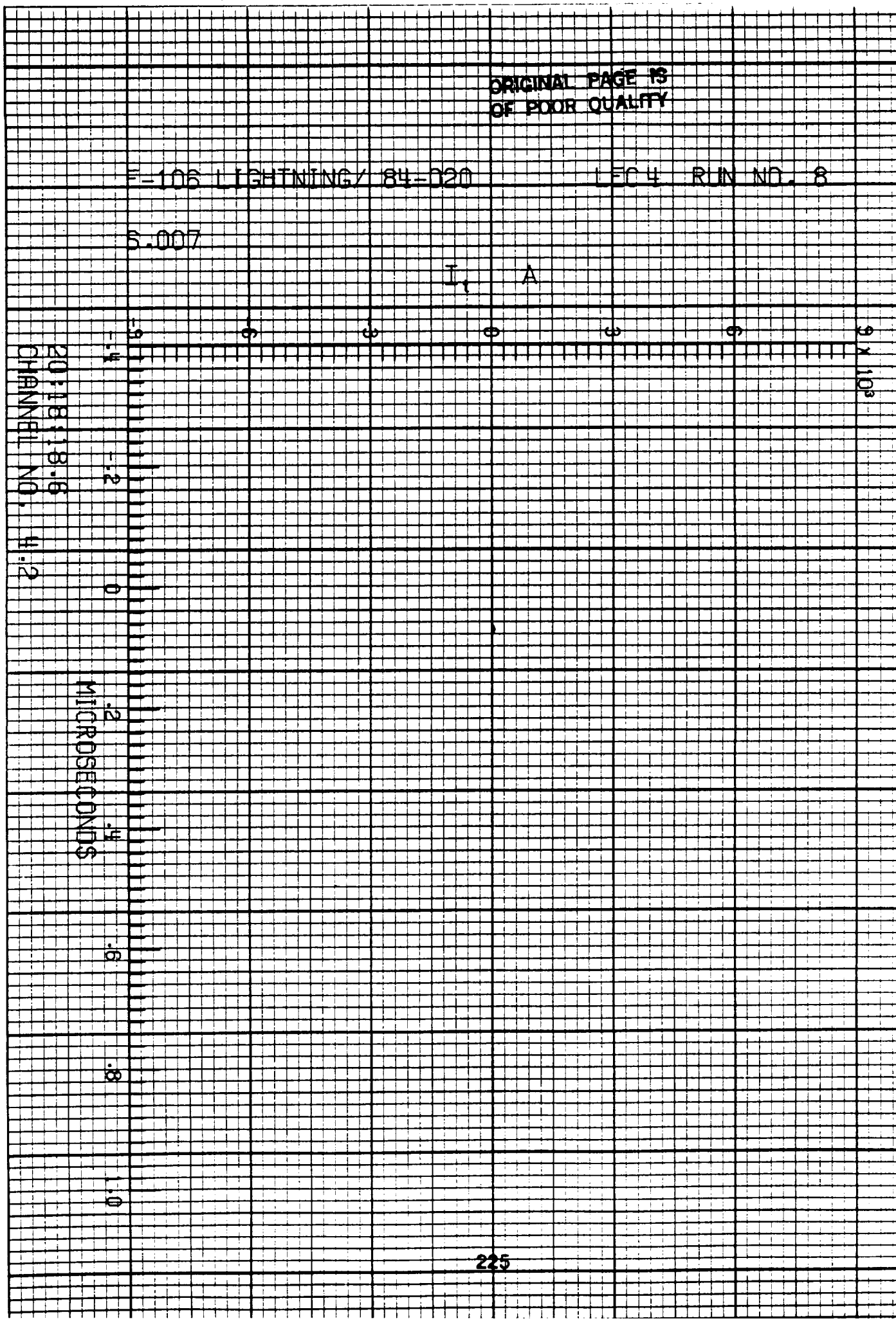

F-106 LIGHTNING/ 84-020
LFC3 RUN NO. 8
S.007
$\dot{D}_f$ A/m²
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:18:18.6
CHANNEL NO. 3.2

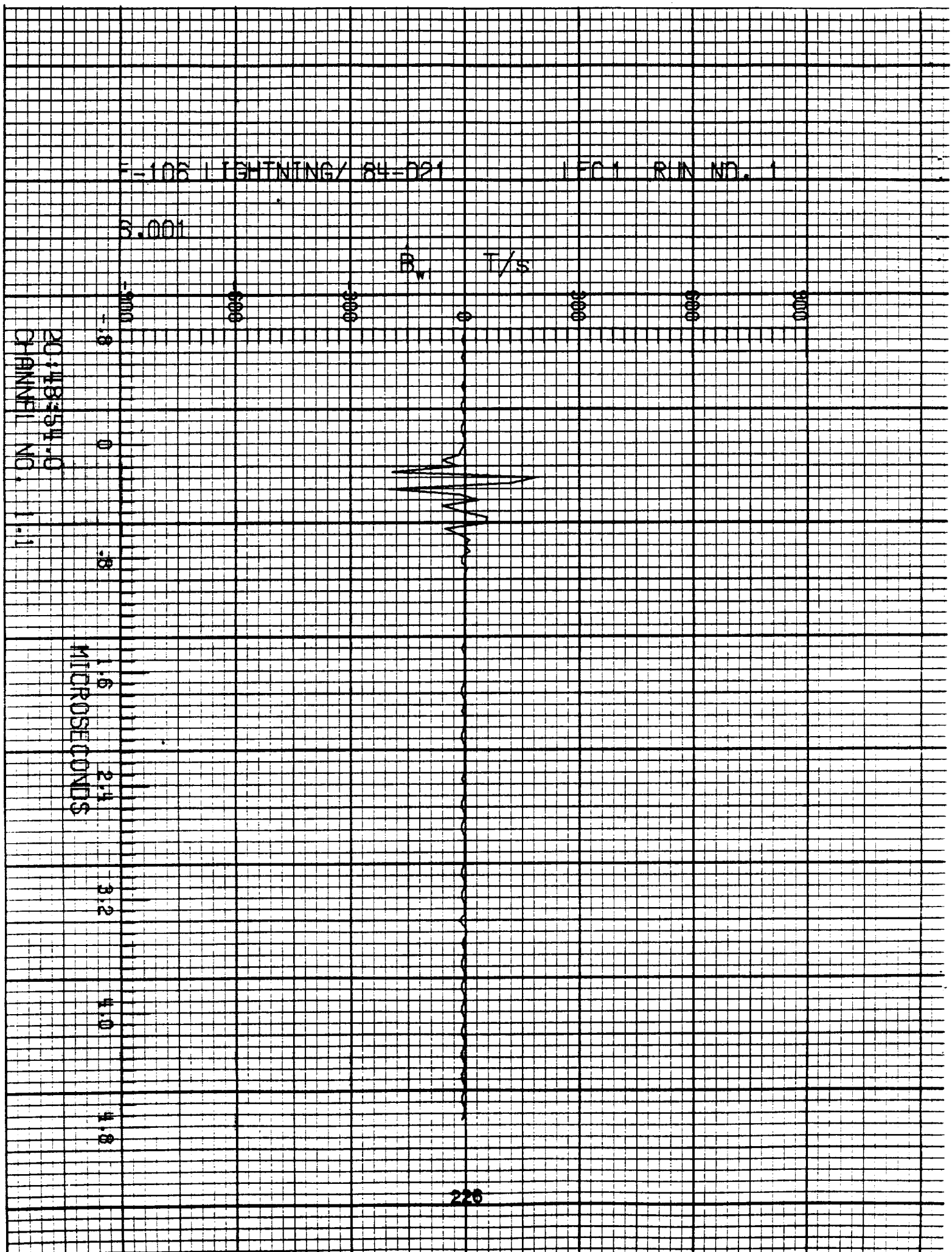
ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-020
LEC4 RUN NO. 8
6.007
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:18:18.6
CHANNEL NO. 4.1

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-021
LFC1 RUN NO. 1
6.001
$\dot{B}_w$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
20:48:54.0
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F=106 LIGHTNING/ 84-021 LFC 1 RUN NO. 1

5.001

B_{WF} T/s

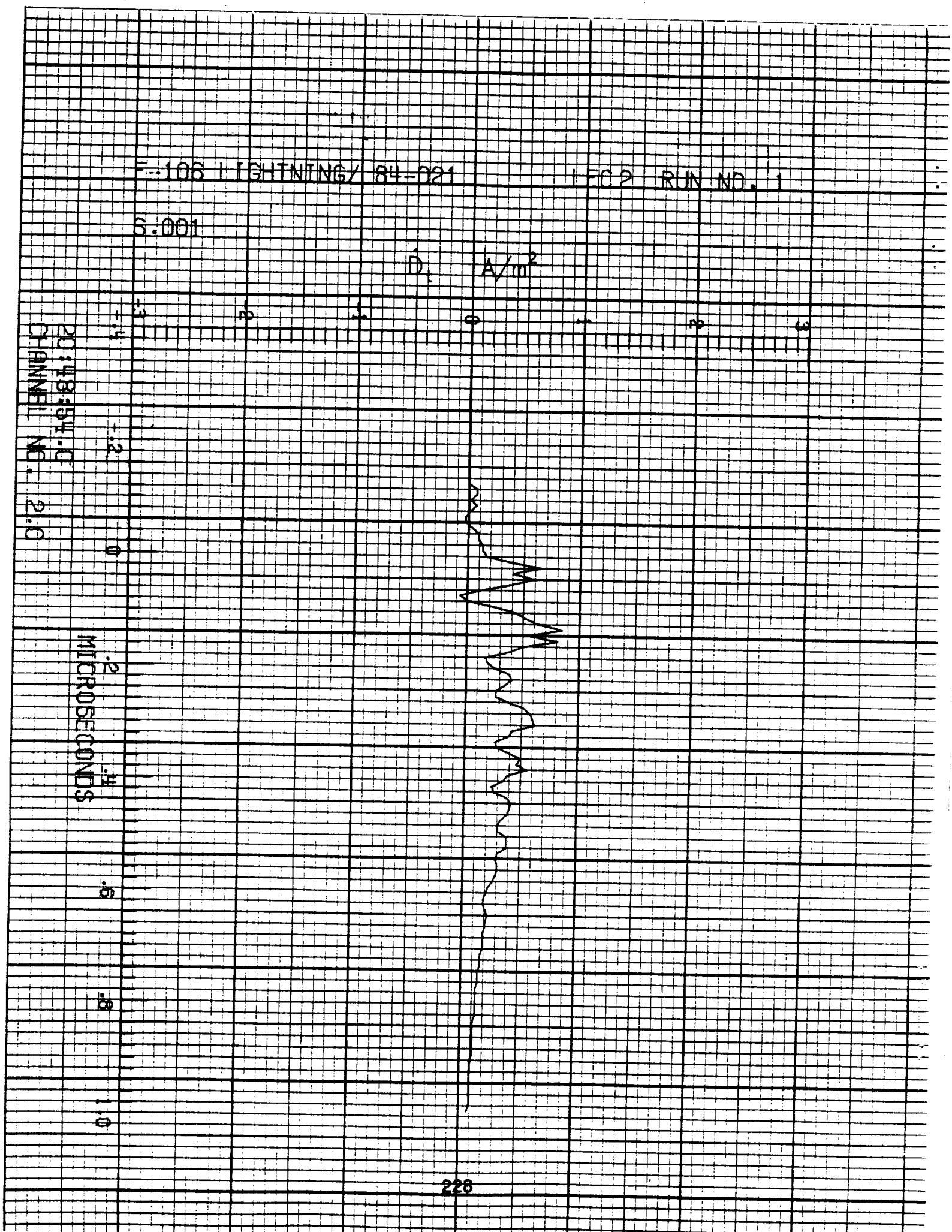
-800 -600 -400 -200 0 200 400 600 800

20:18:54.0
CHANNEL NO. 1:2

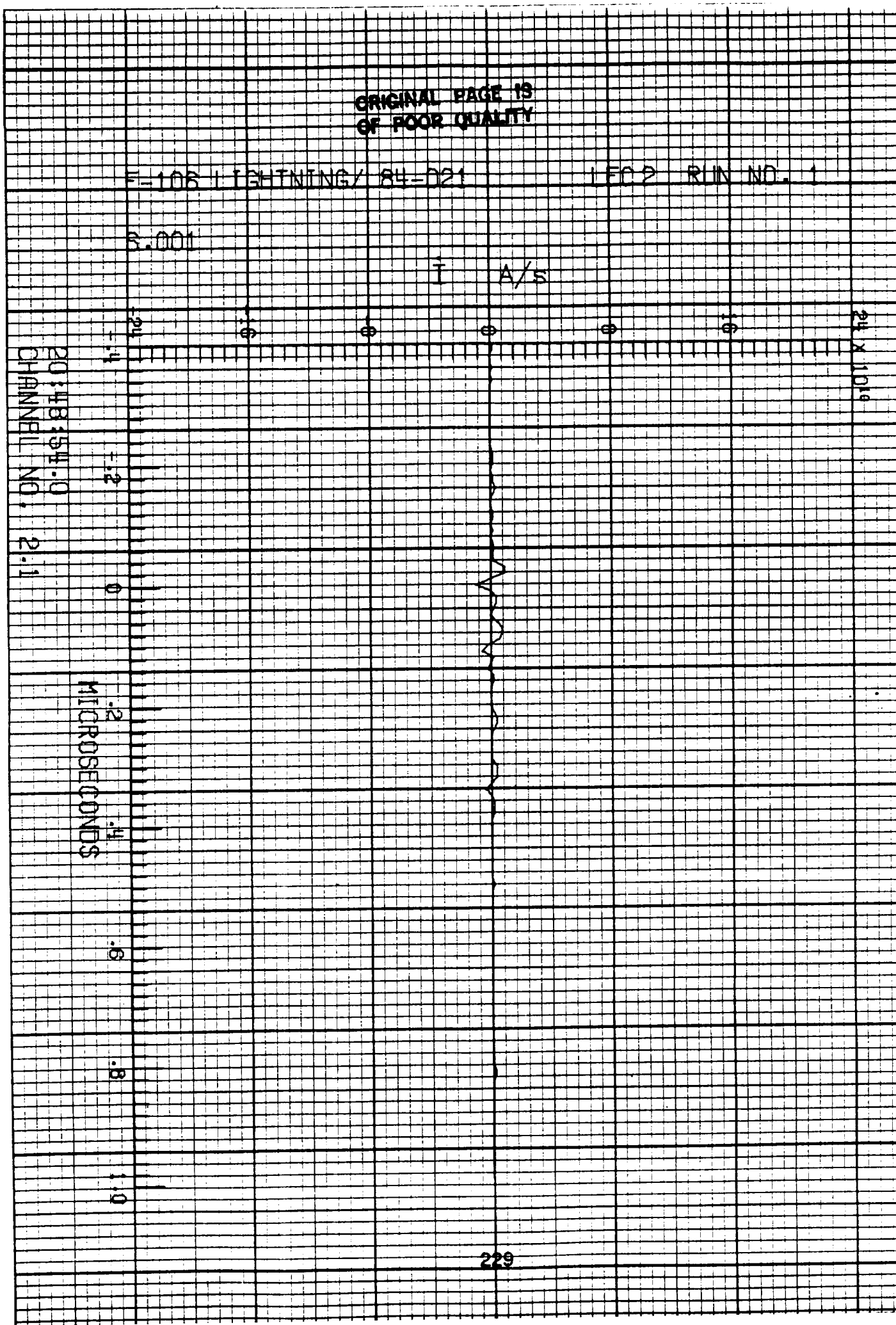
-8 0 8

1:6 MICROSECONDS 2:4

-8 0 8


F-106 LIGHTNING/ 84-021
LFC2 RUN NO. 1
S.001
$\dot{D}_t$ A/m^2
-3
-2
-1
0
1
2
3
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:48:54.0
CHANNEL NO. 2.0

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-021 FC2 RUN NO. 1

6.001

$\dot{B}_1$ T/s

-1000 -800 -600 0 600 800 1000

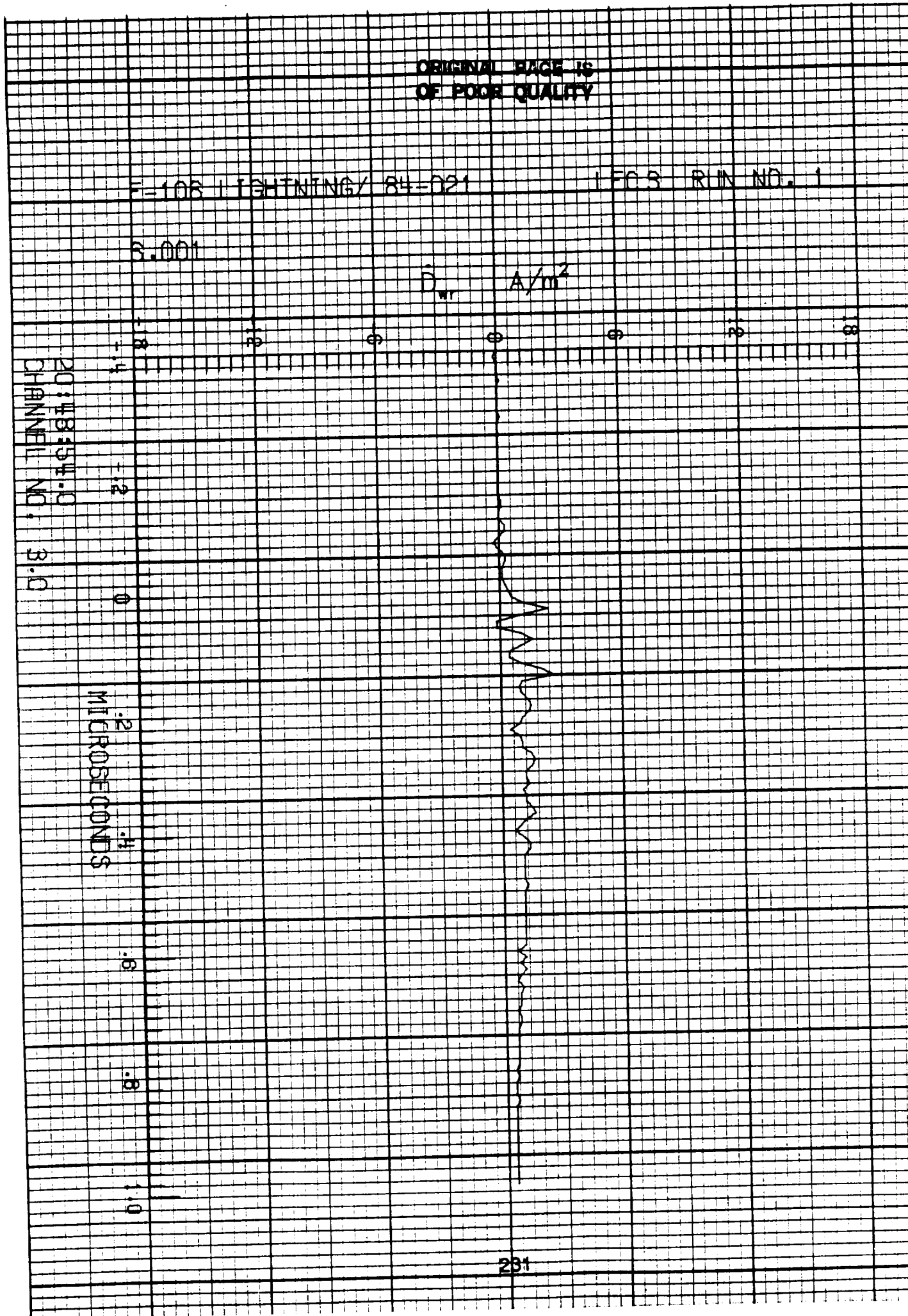
-1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

CHANNEL NO. 2.2

20:18:54.20

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-021 IFCS RUN NO. 1

6.001

$\dot{D}_{w1}$ A/m^2

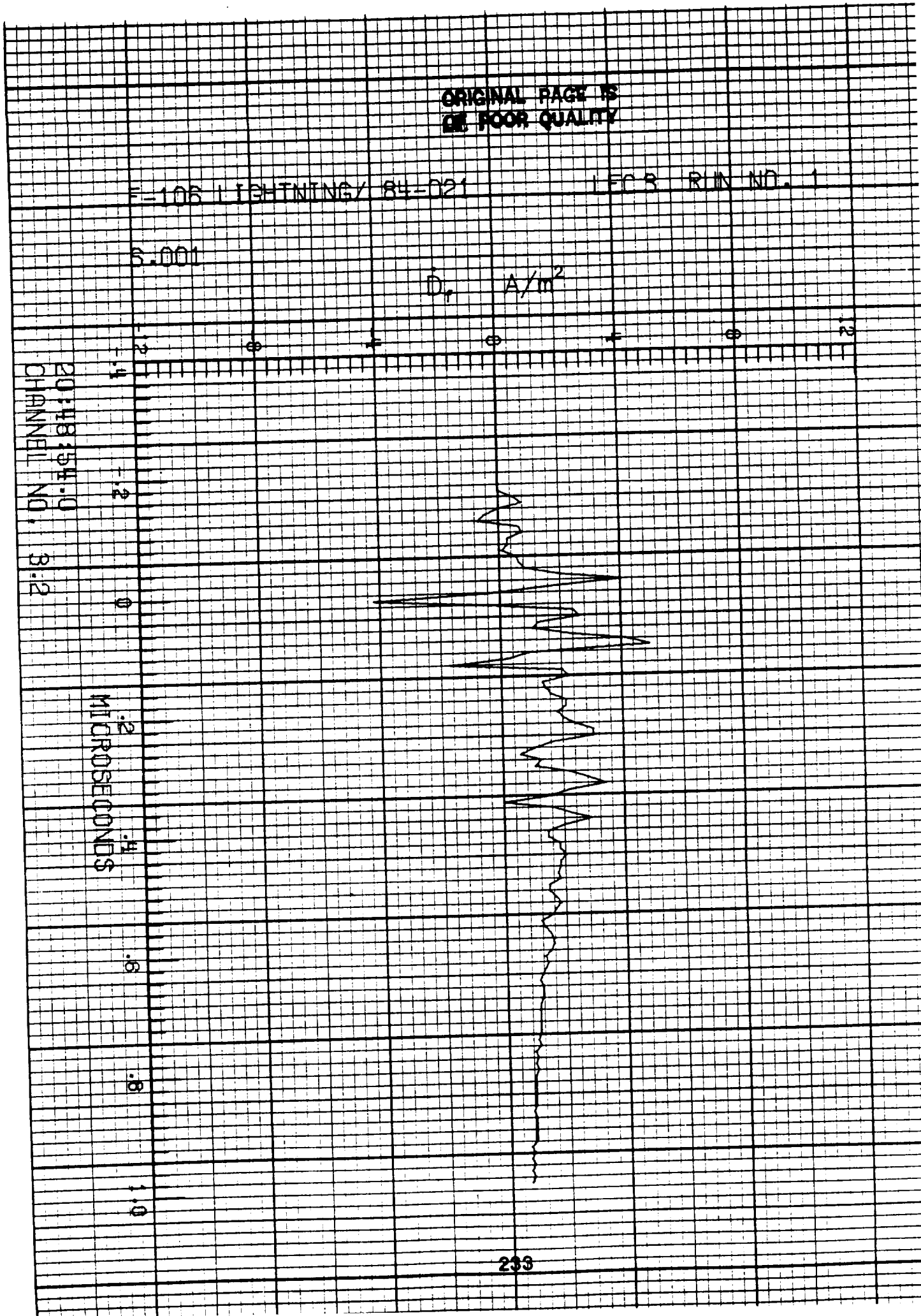
-18 -12 -6 0 6 12 18

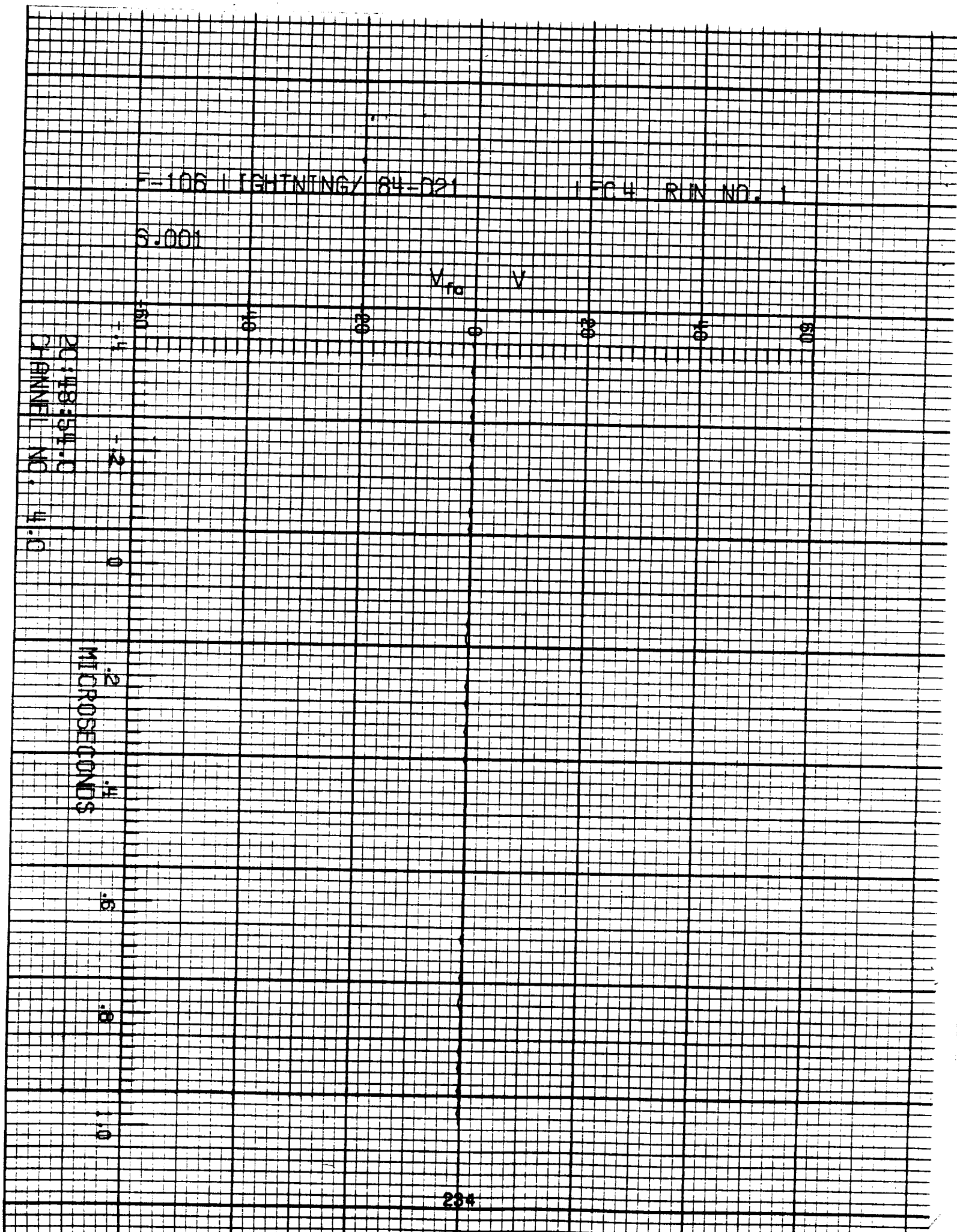
-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2 1.4

MICROSECONDS

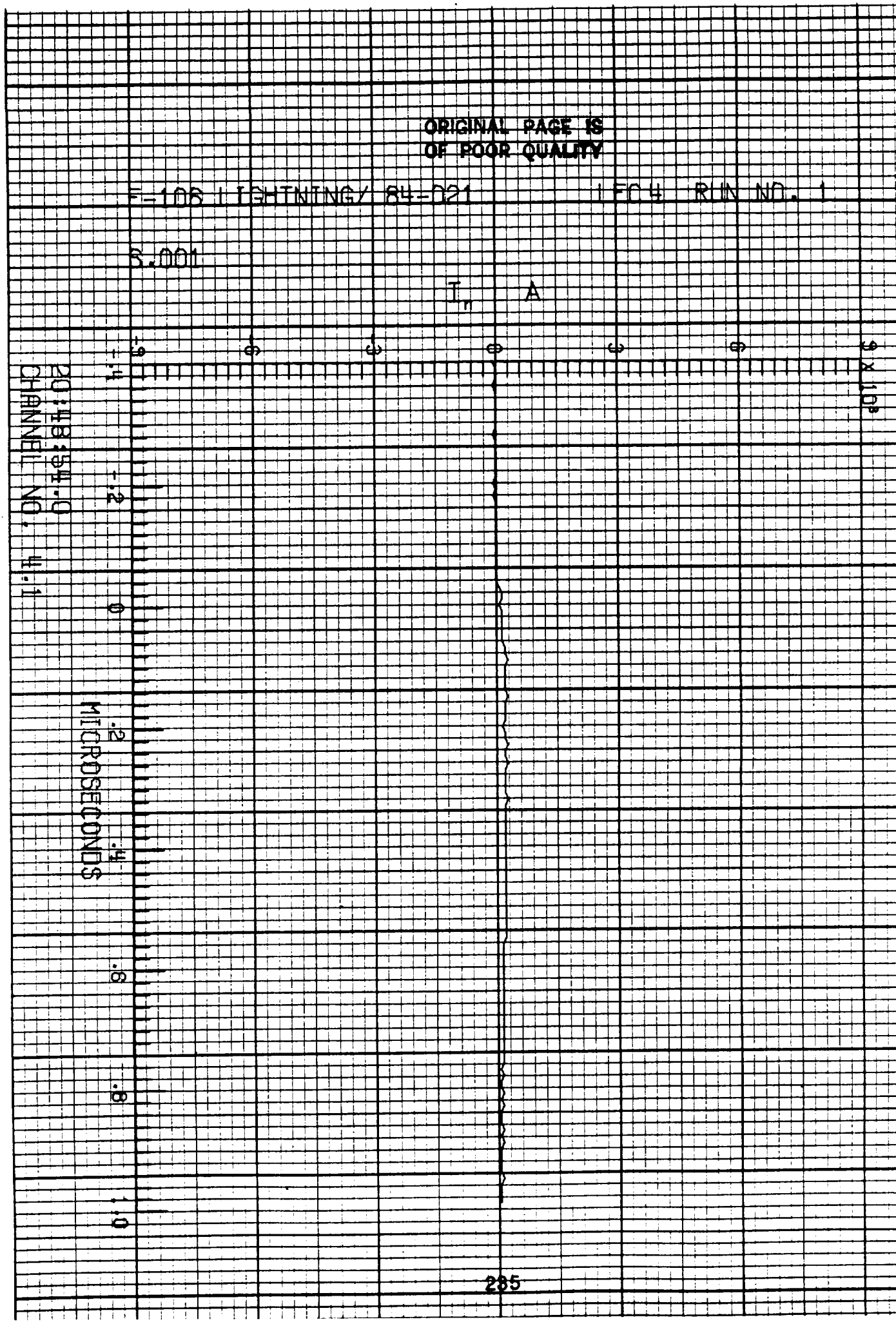
20:18:54.0
CHANNEL NO. 3

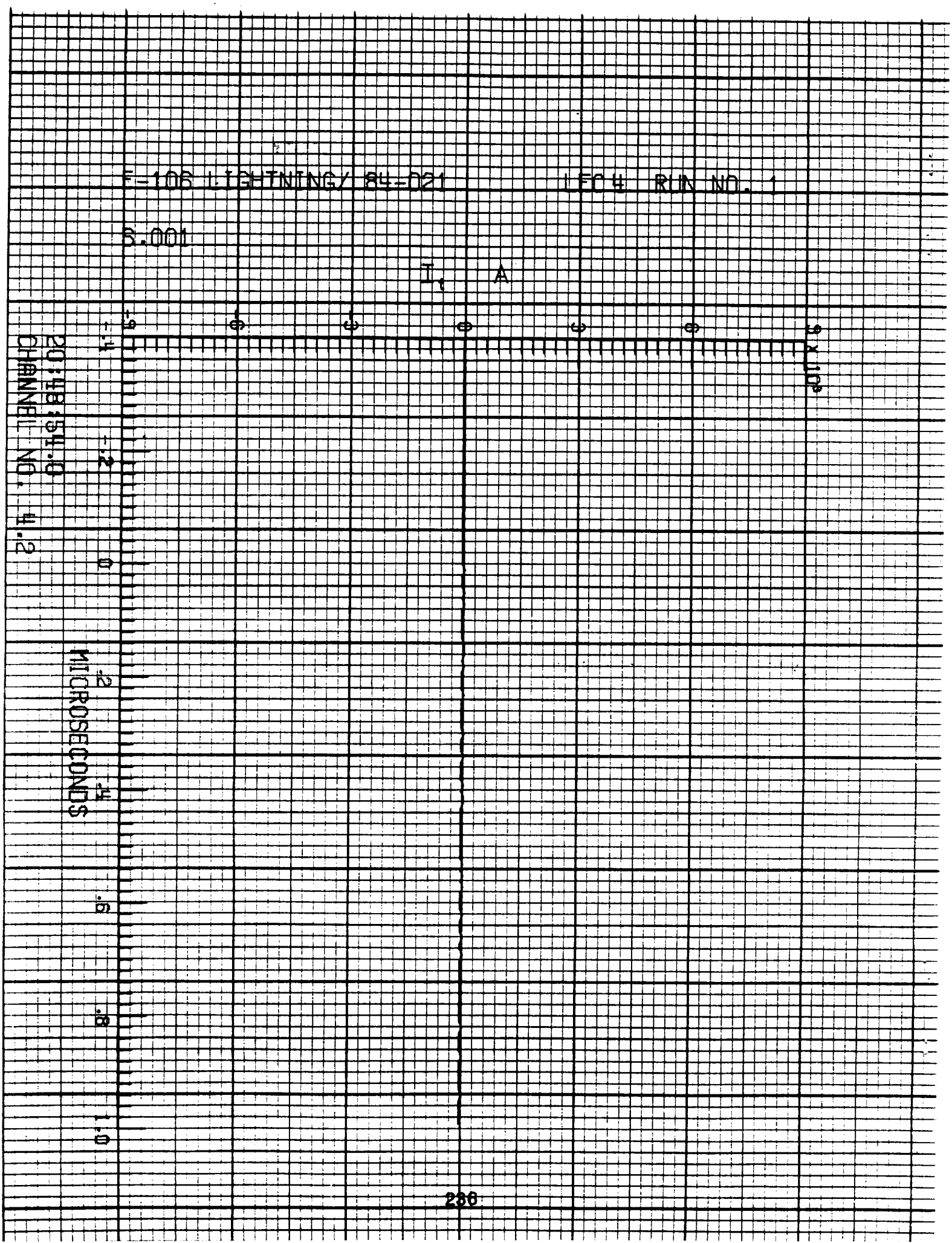
ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-021
LFC4 RUN NO. 1
6.001
V_{fa} V
-60
-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:48:54.0
CHANNEL NO. 4.0

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-021
LEC 4 RUN NO. 1
6.001
I_t A
-9
-6
-3
0
3
6
9 x 10^3
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:48:54.0
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-021 LFC 1 RUN NO. 2

5.008

$\dot{B}_w$ T/s

-800 -600 -400 -200 0 200 400 600

-11.2 -10.4 -9.6 -8.8 -8.0 -7.2 -6.4 -5.6

MICROSECONDS

21:13:22.0

CHANNEL NO. 1.1

F-106 LIGHTNING/ 84-021 LFC1 RUN NO. 2

6.008

B_{wr} T/s

-800 -600 -400 -200 0 200 400 600 800

-11.2 -10.4 -9.6 -8.8 -8.0 -7.2 -6.4 -5.6

MICROSECONDS

21:13:22.0

CHANNEL NO. 1:2

ORIGINAL PAGE IS
OF POOR QUALITY

F=106 LIGHTNING/ 84=021 LEC 2 RUN NO. 2

6.008

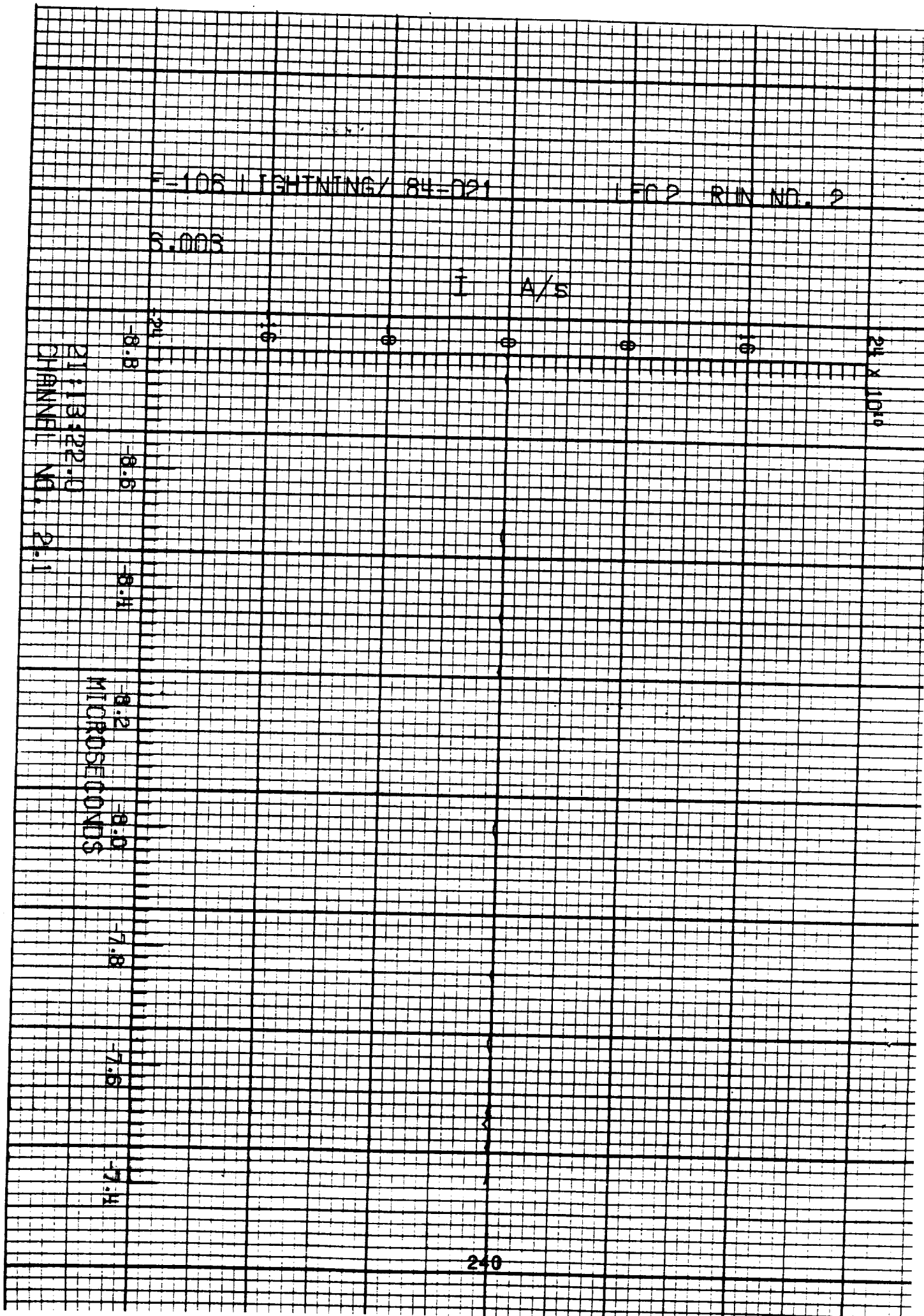
$\bar{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-8.8
-8.6
-8.4
-8.2
-8.0
-7.8
-7.6
-7.4

21:13:22.0
CHANNEL NO. 2.0

MICROSECONDS


F-106 LIGHTNING/ 84-021
LFC2 RUN NO. 2
6.003
I A/S
-24
-16
0
0
0
16
24 x 10^10
-8.8
-8.6
-8.4
-8.2
-8.0
-7.8
-7.6
-7.4
MICROSECONDS
21:13:22.0
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-021 IFO2 RUN NO. 2

5.00R

B_1 T/S

-1800 -1200 -600 0 600 1200 1800

-8.8
-8.6
-8.4
-8.2
-8.0
-7.8
-7.6
-7.4

MICROSECONDS

21:13:22.0
CHANNEL NO. 2.2

F-106 LIGHTNING/ 84-021 IFC 3 RUN NO. 2

6.008

$\dot{D}_{wr}$ A/m^2

-8.8 -8.6 -8.4 -8.2 -8.0 -7.8 -7.6 -7.4

MICROSECONDS

21:13:22.0

CHANNEL NO. 3.0

ORIGINAL PAGE IS
OF POOR QUALITY

F=106 LIGHTNING/ 84=021 IEC 3 RUN NO. 2

R.008

$\dot{D}_{wi}$ A/m^2

-8.8

-8.6

-8.4

-8.2

-8.0

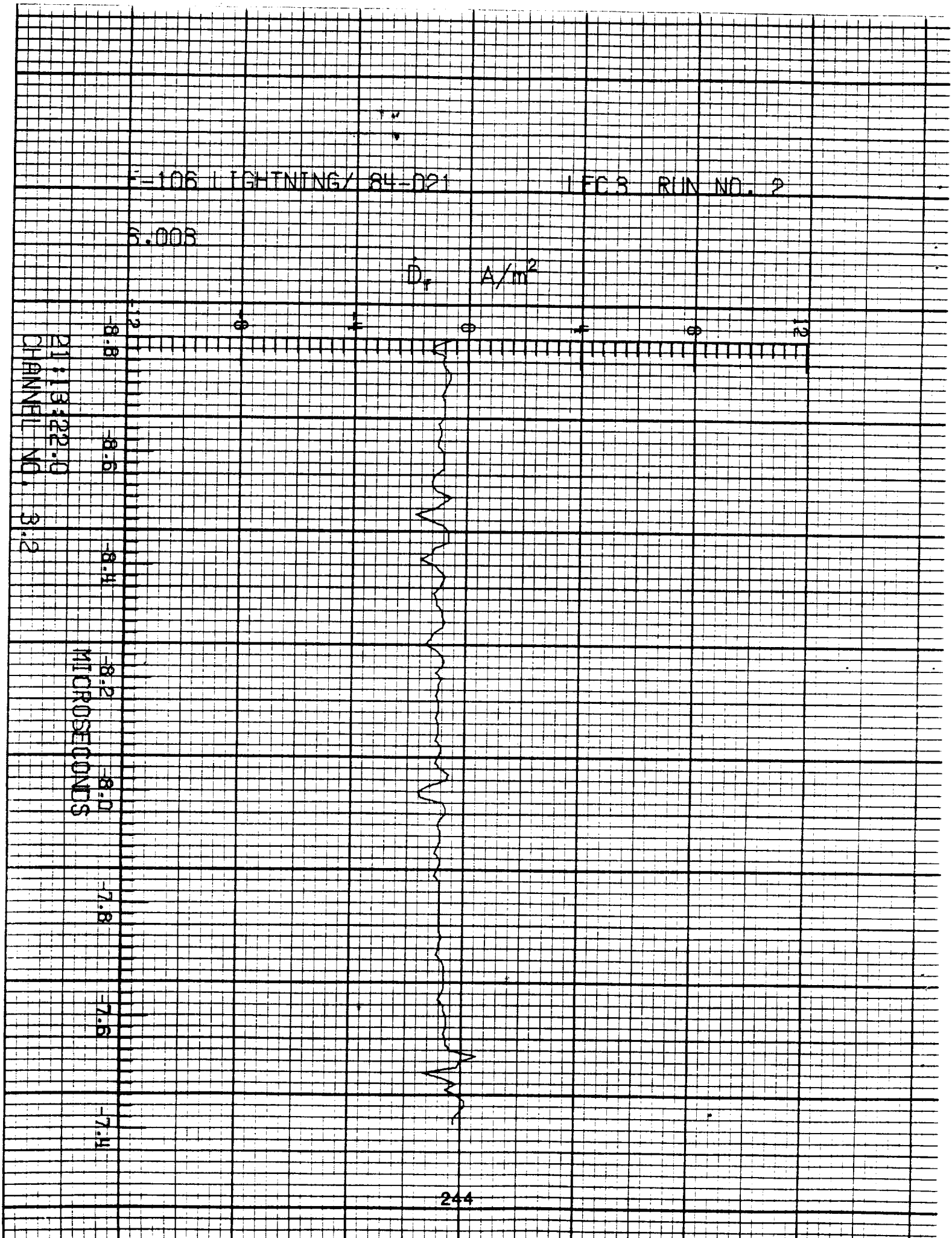
-7.8

-7.6

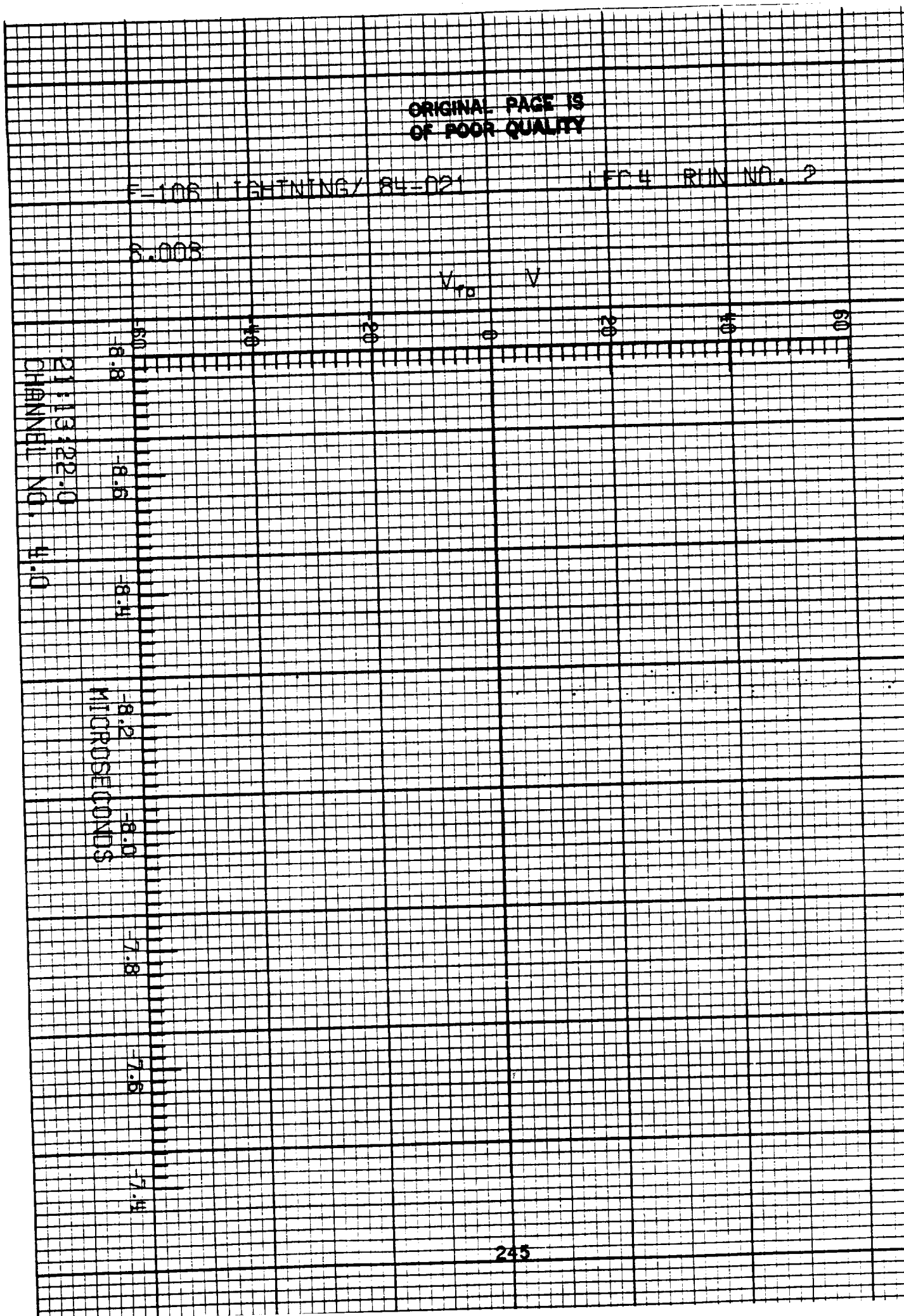
-7.4

MICROSECONDS

21:13:22.0
CHANNEL NO. 3.1


F-106 LIGHTNING/ 84-021
LFC3 RUN NO. 2
6.008
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-8.8
-8.6
-8.4
-8.2
-8.0
-7.8
-7.6
-7.4
MICROSECONDS
21:13:22.0
CHANNEL NO. 3.2

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-021 IFC4 RUN NO. 2

5.008

T_n A

-8.8

-8.6

-8.4

-8.2

-8.0

-7.8

-7.6

-7.4

MICROSECONDS

21:18:22.0

CHANNEL NO. #1

ORIGINAL PAGE IS
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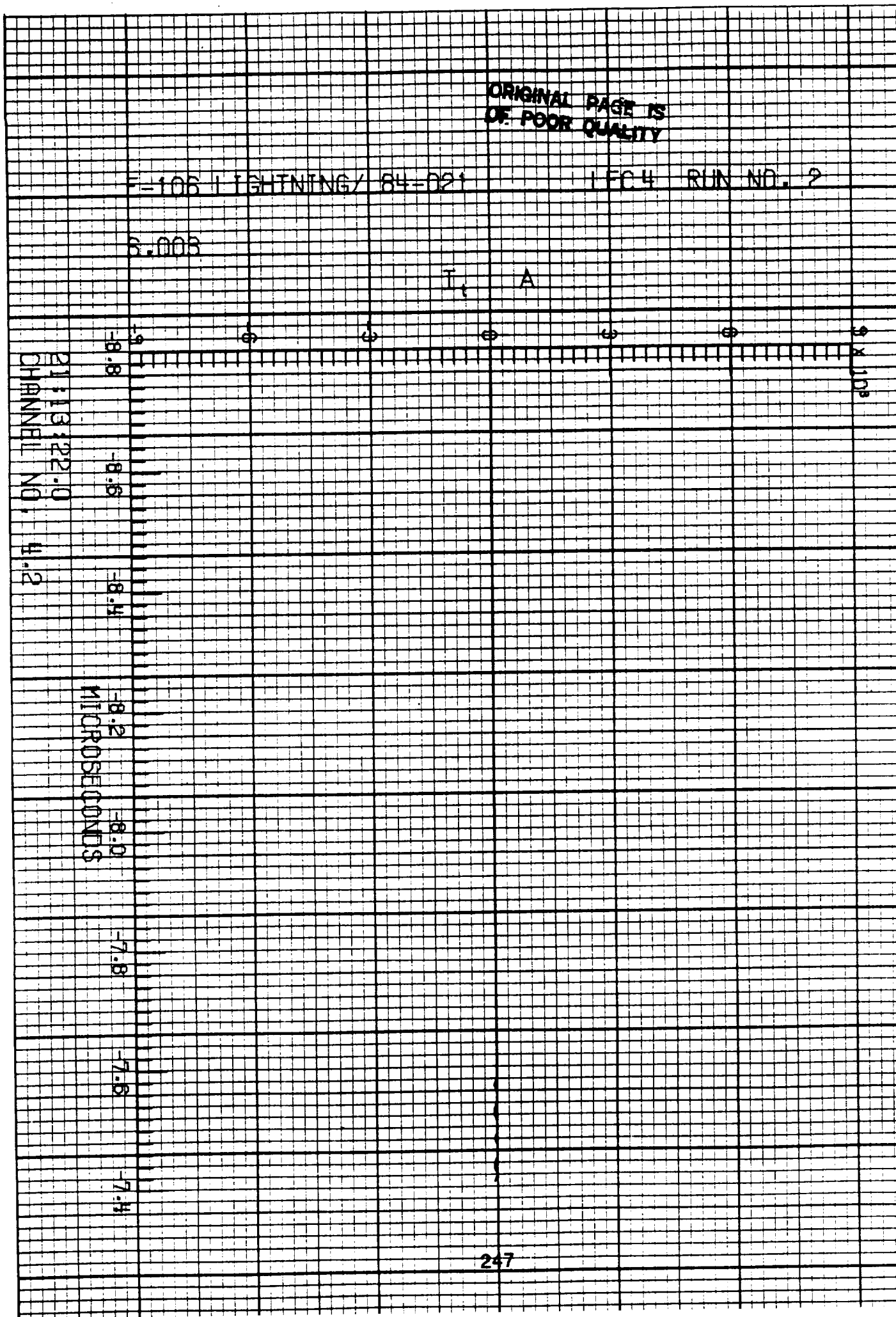
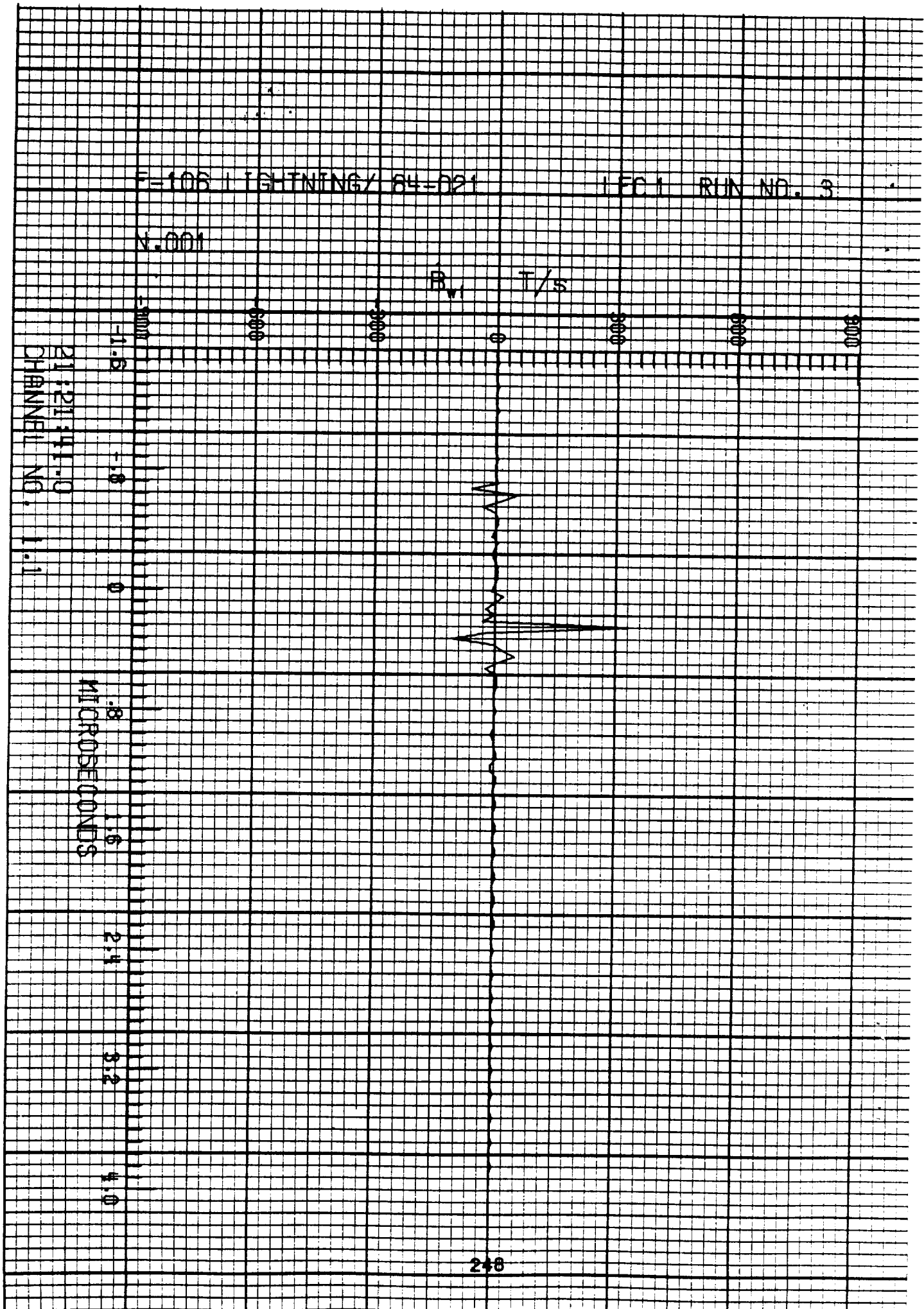



F=106 LIGHTNING/ 84-021
LFC1 RUN NO. 3
N.001
$\dot{B}_{w1}$ T/s
-300
-600
-300
0
300
600
900
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
21:21:41.0
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-021 FC 1 RUN NO. 3

V.001

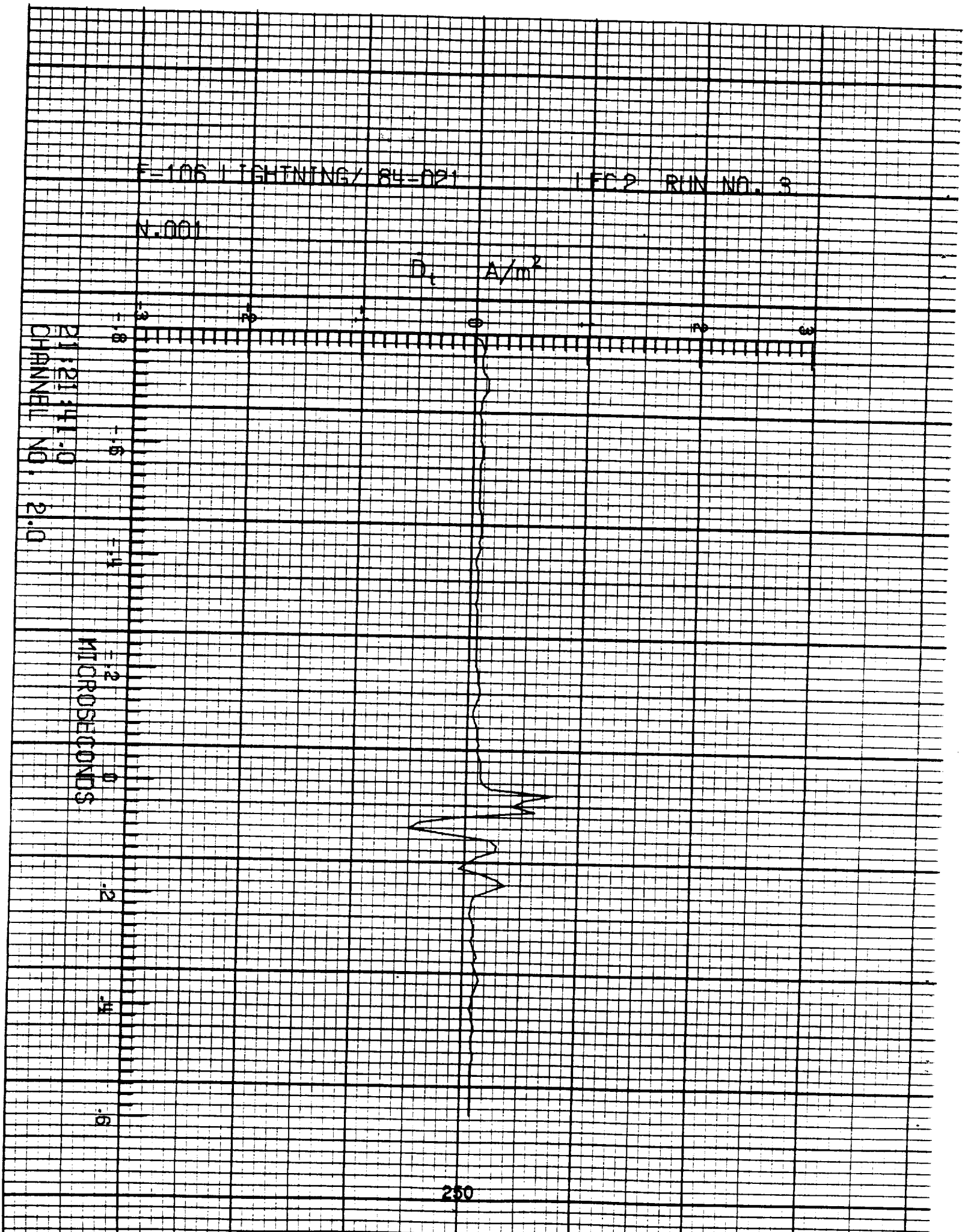
$\dot{B}_{wr}$ T/s

-800 -600 -400 -200 0 200 400 600 800

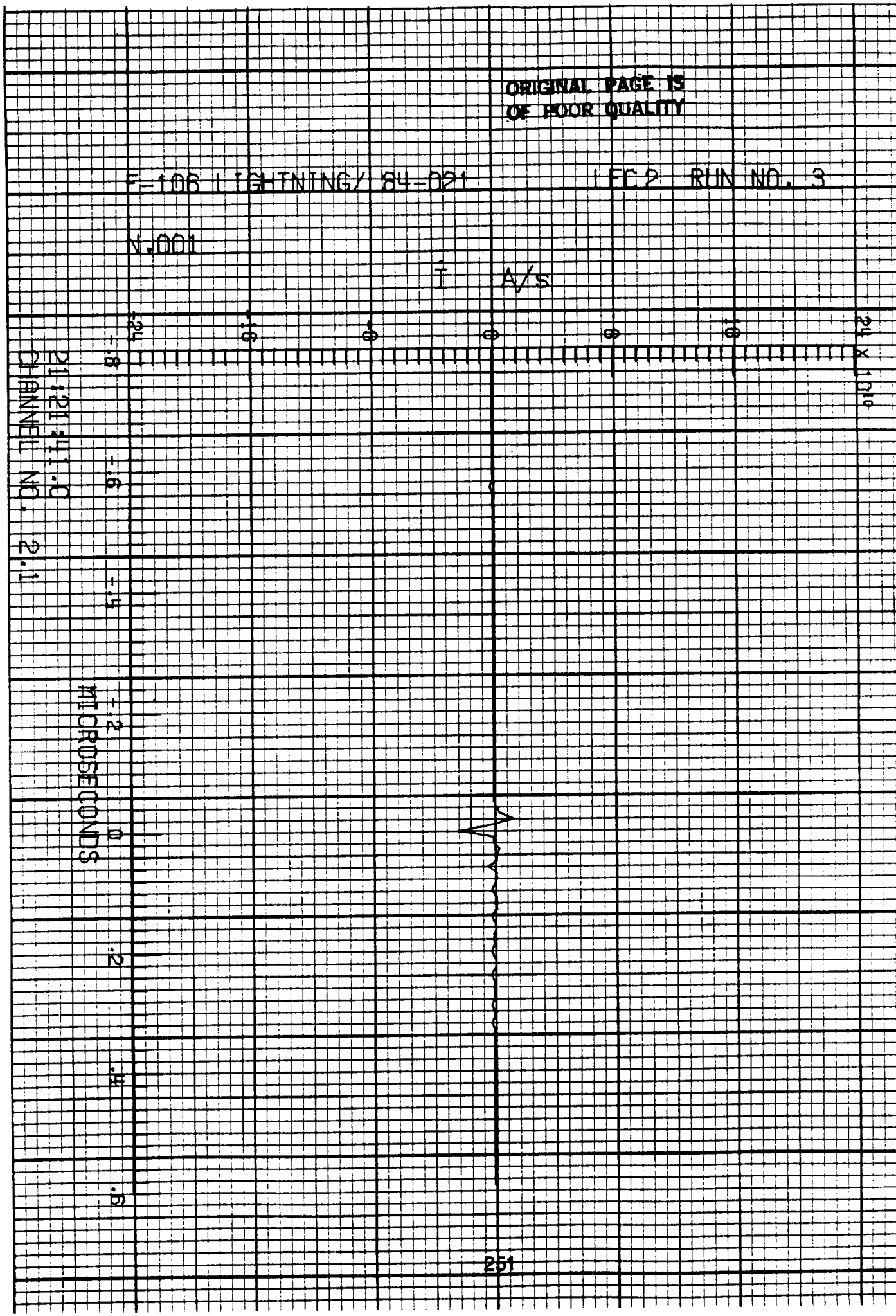
-1.6 -1.2 -.8 -.4 0 .4 .8 1.2 1.6 2.4 3.2 4.0

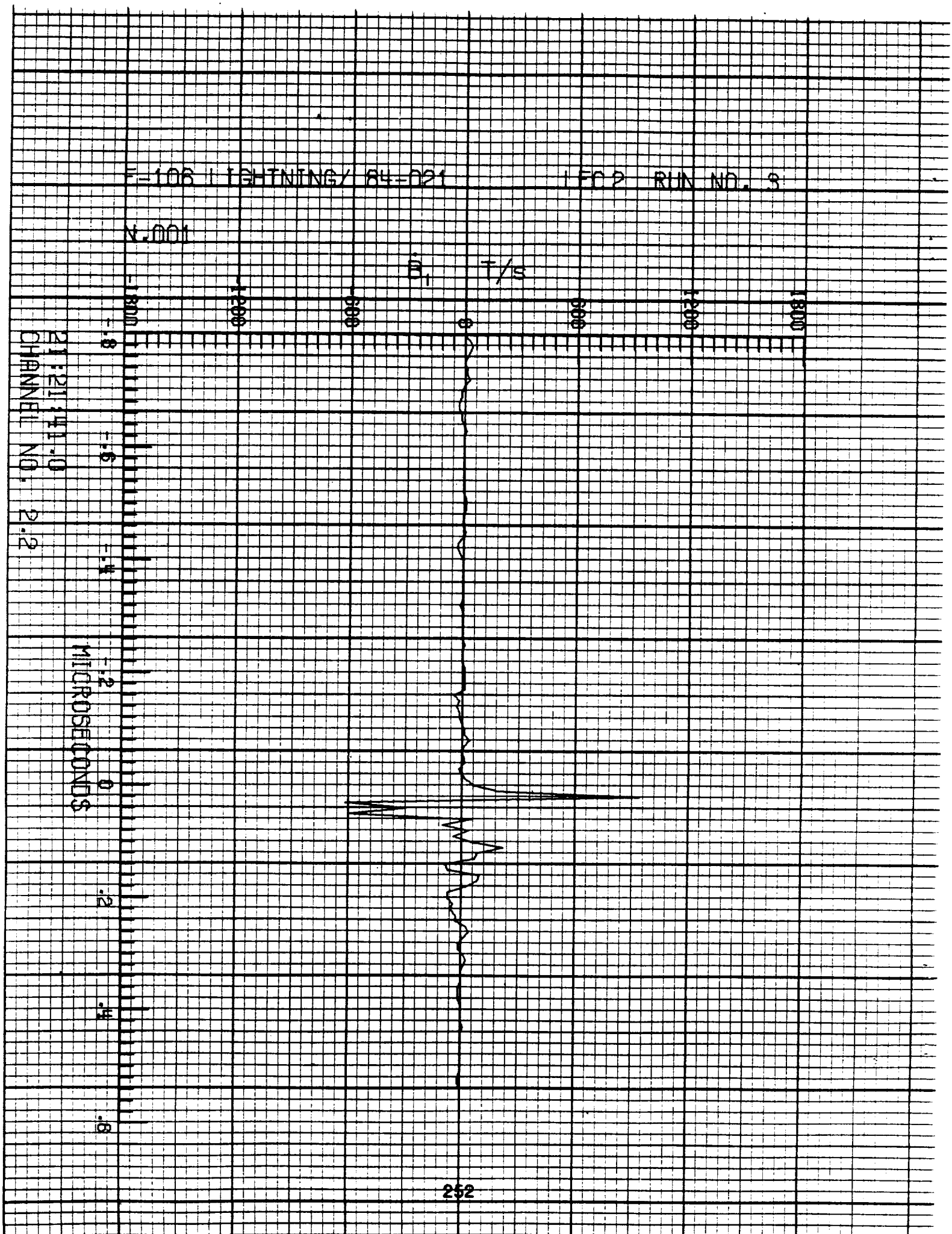
MICROSECONDS

21:21:11.0
CHANNEL NO. 1

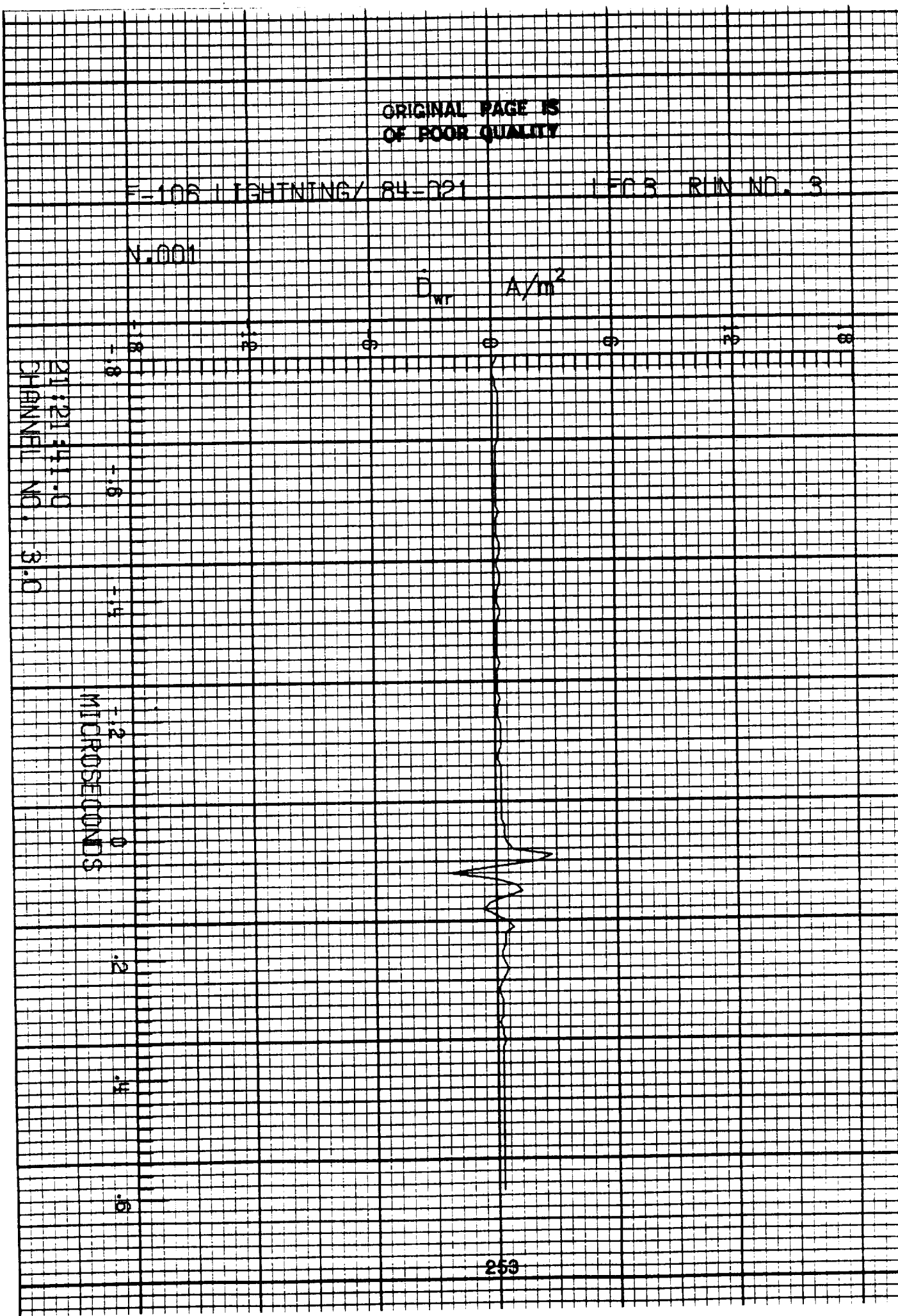

F-106 LIGHTNING/ 84-021
LFC2 RUN NO. 3
N.001
$\dot{D}_t$ A/m²
-3
-2
-1
0
1
2
3
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
21:21:41.0
CHANNEL NO. 2.0

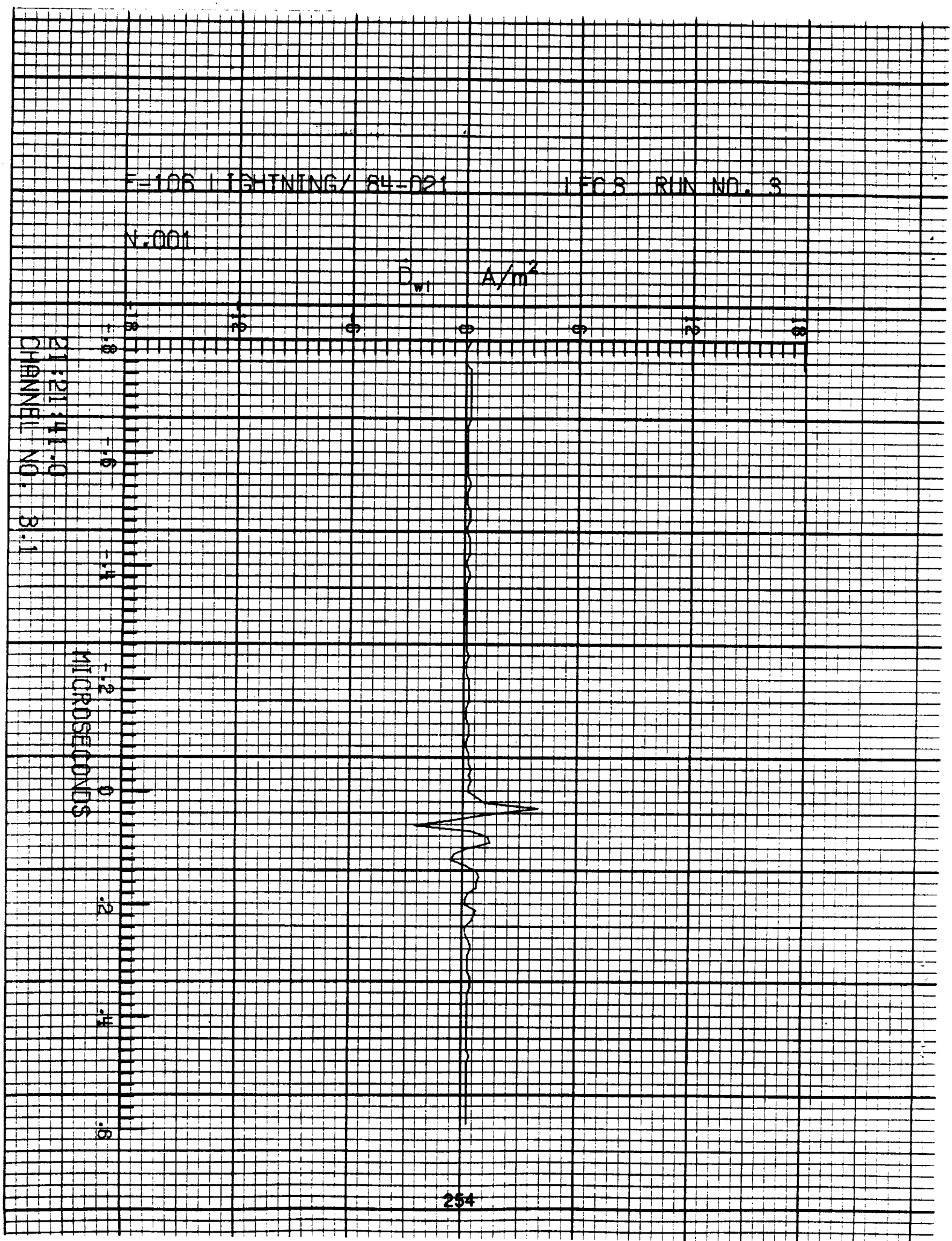
ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-021
FC2 RUN NO. 3
N.001
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
21:21:41.0
CHANNEL NO. 2.2

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-021
LFC3 RUN NO. 3
N.001
$\dot{D}_{wi}$ A/m^2
-18
-12
-6
0
6
12
18
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
21:21:41.0
CHANNEL NO. 3.1

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OF POOR QUALITY

F-106 LIGHTNING/ 84-021 IFC3 RUN NO. 3

N.001

$\dot{D}_f$ A/m^2

+.8 +.6 +.4 +.2 0 -.2 -.4 -.6

MICROSECONDS

CHANNEL NO. 8.2

21:21:11.10

F-106 LIGHTNING/ 84-021 LFC4 RUN NO. 3

N.001

V_{rb} V

-50 -40 -30 -20 -10 0

-.8 -.6 -.4 -.2 0 .2 .4 .6

MICROSECONDS

CHANNEL NO. 4 D.

21:21:11.0

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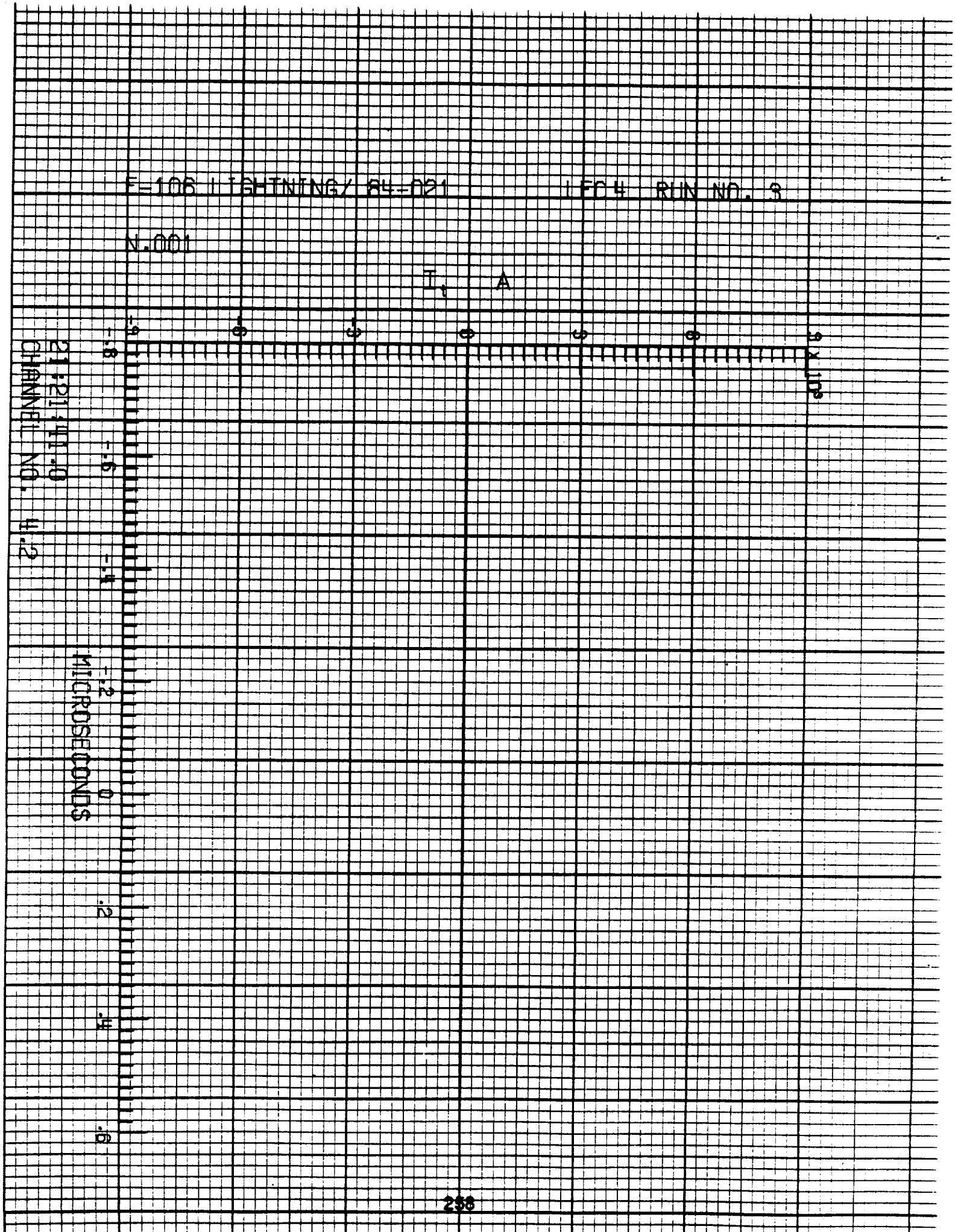
F-106 LIGHTNING/ 84-021 IFC4 RUN NO. 3

N.001

I_n A

MICROSECONDS

CHANNEL NO. 11


F-106 LIGHTNING/ 84-021
LFC4 RUN NO. 3
N.001
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
21:21:41.0
CHANNEL NO. 4.2

ORIGINAL PAGE IS
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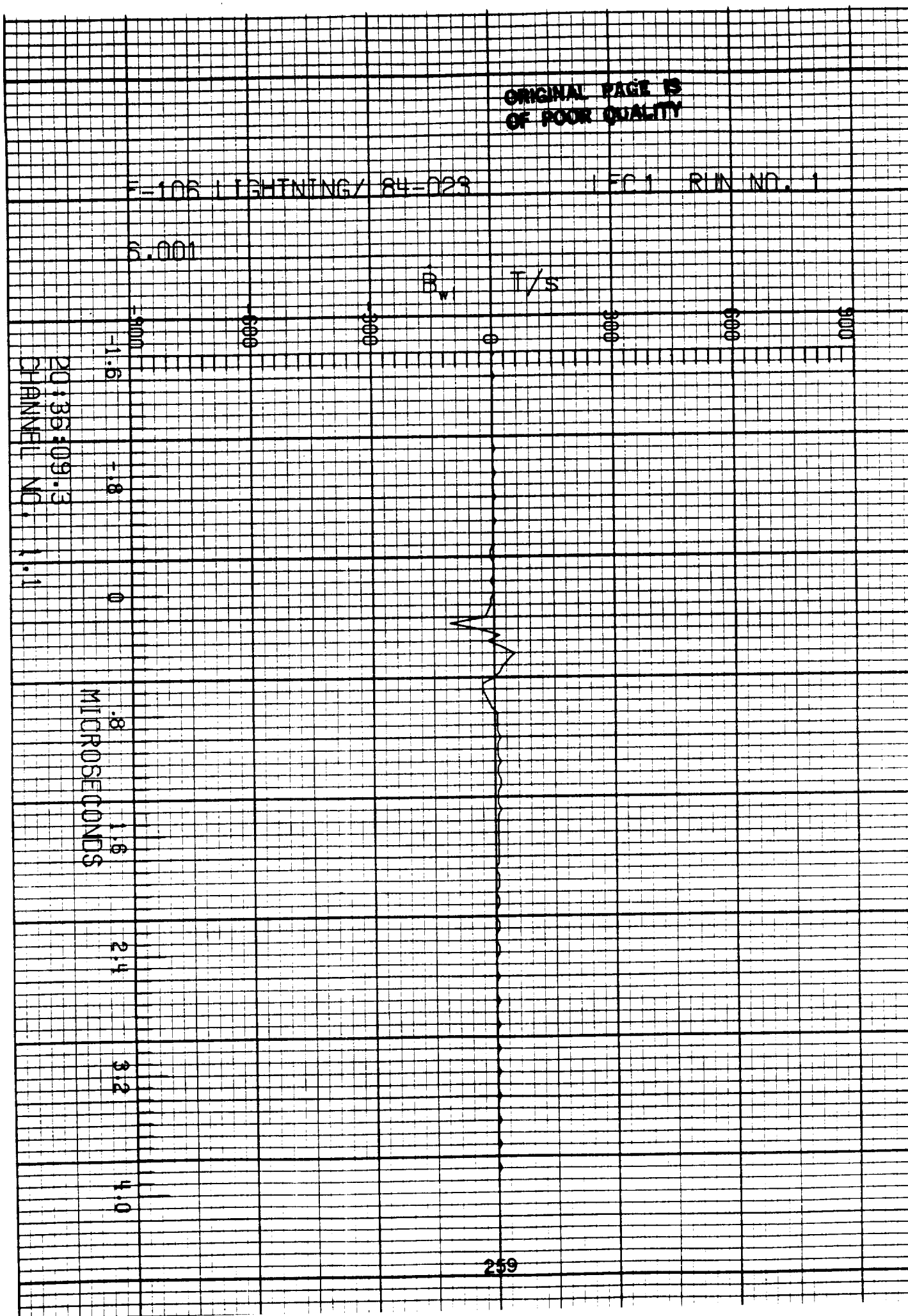


F-106 LIGHTNING/ 84-023 LEC1 RUN NO. 1

5.001

$\dot{B}_{wr}$ T/S

-600 -400 -200 0 200 400 600

-1.5 -.8 0 .8 1.6 2.4 3.2 4.0

MICROSECONDS

20:36:06.3

CHANNEL NO. 1.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-023 IFC 2 RUN NO. 1

5.001

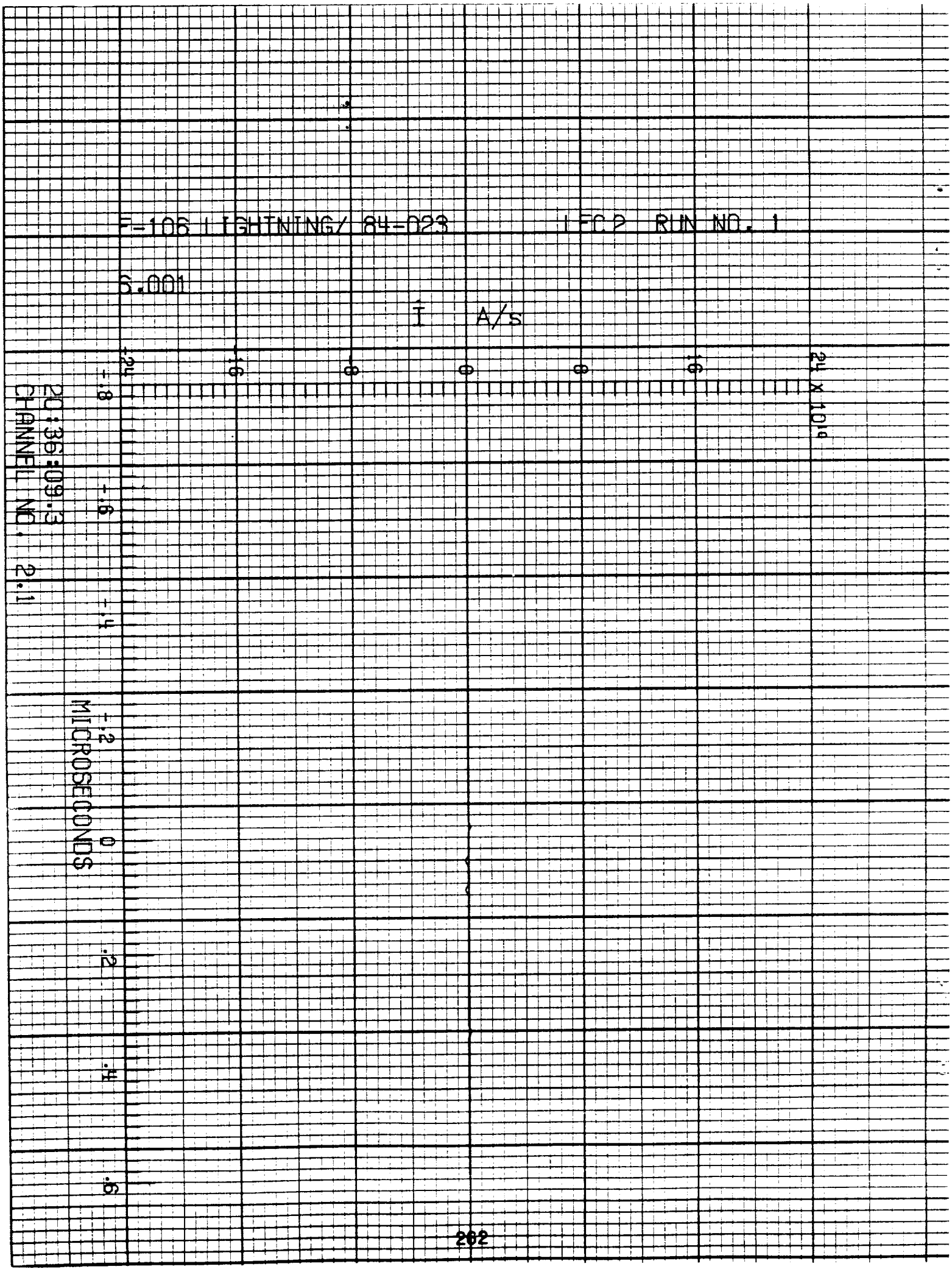
D_t A/m²

-3 -2 -1 0 1 2 3

-.8 -.6 -.4 -.2 0 .2 .4 .6

20:36:08.3
CHANNEL NO. 2.0

MICROSECONDS


F-106 LIGHTNING/ 84-023
LFC2 RUN NO. 1
6.001
Î A/s
-24
-16
-8
0
8
16
24 x 10^10
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
20:36:09.3
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-023 LFC2 RUN NO. 1

6.001

$\dot{B}_1$ T/S

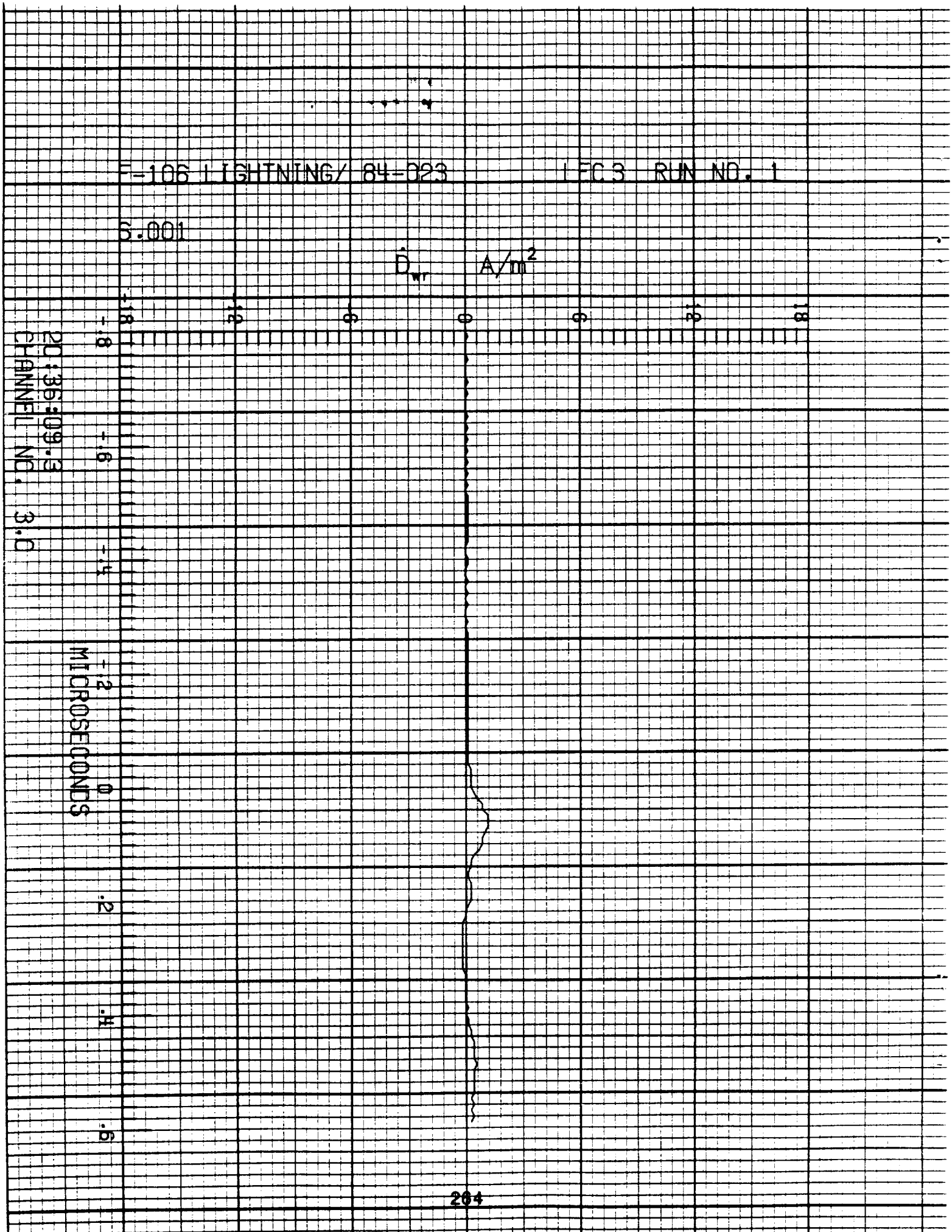
-1800 -1200 -600 0 600 1200 1800

-8 -6 -4 -2 0 2 4 6

MICROSECONDS

20:39:09.3

CHANNEL NO. 2:2


F-106 LIGHTNING/ 84-023 IEC 3 RUN NO. 1
5.001
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
20:39:09.3
CHANNEL NO. 3.0

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-023 FC 3 RUN NO. 1

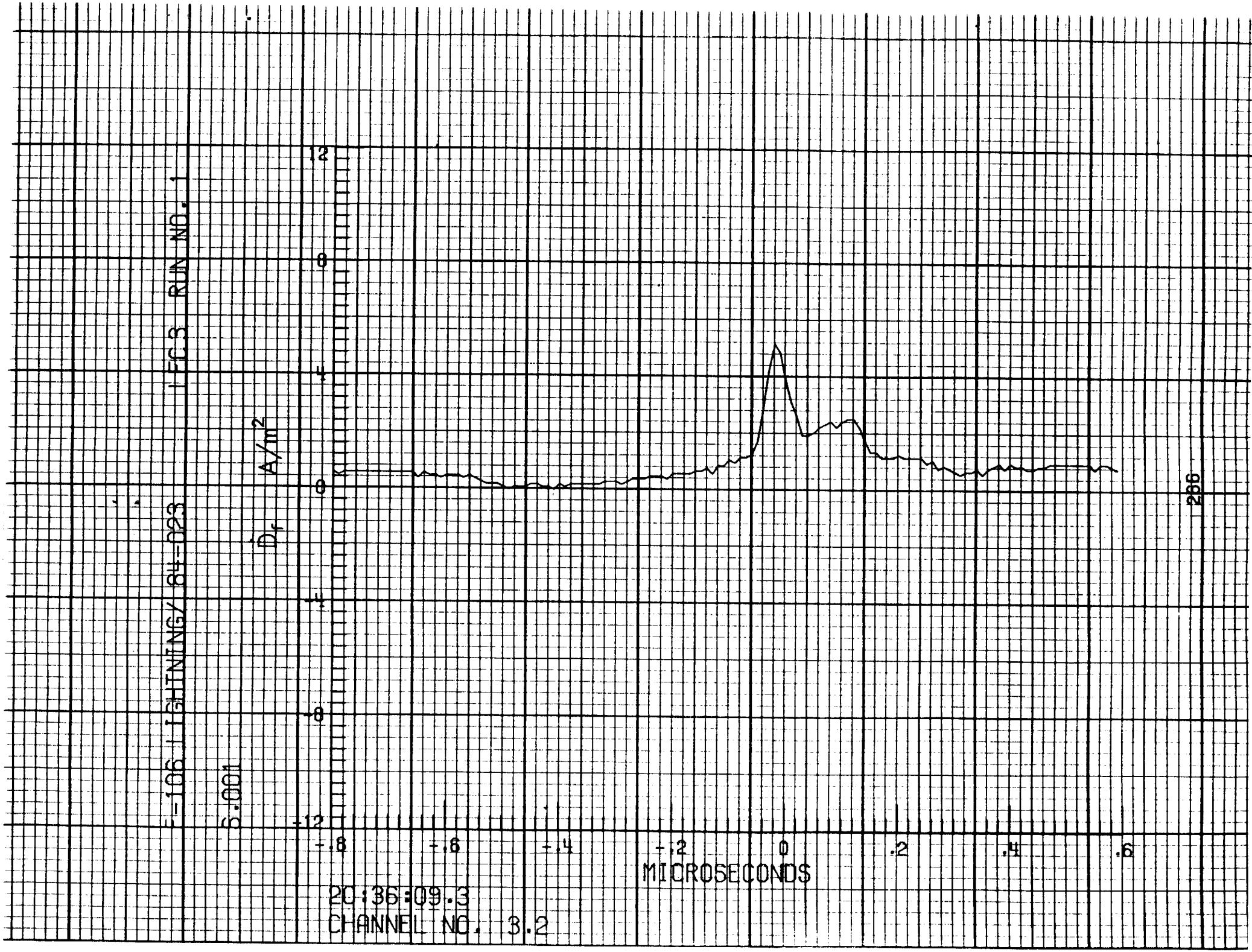
8.001

$\dot{D}_{wi}$ A/m^2

-.8 -.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

20:36:09.3 CHANNEL NO. 3.1


F=106 LIGHTNING/ 84=023 +FC3 RUN NO. 1
6.001
D_f A/m^2
12
8
4
0
-4
-8
-12
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
20:36:09.3
CHANNEL NO. 3.2
266

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-023 LFC4 RUN NO. 1

5.001

V_{fa} V

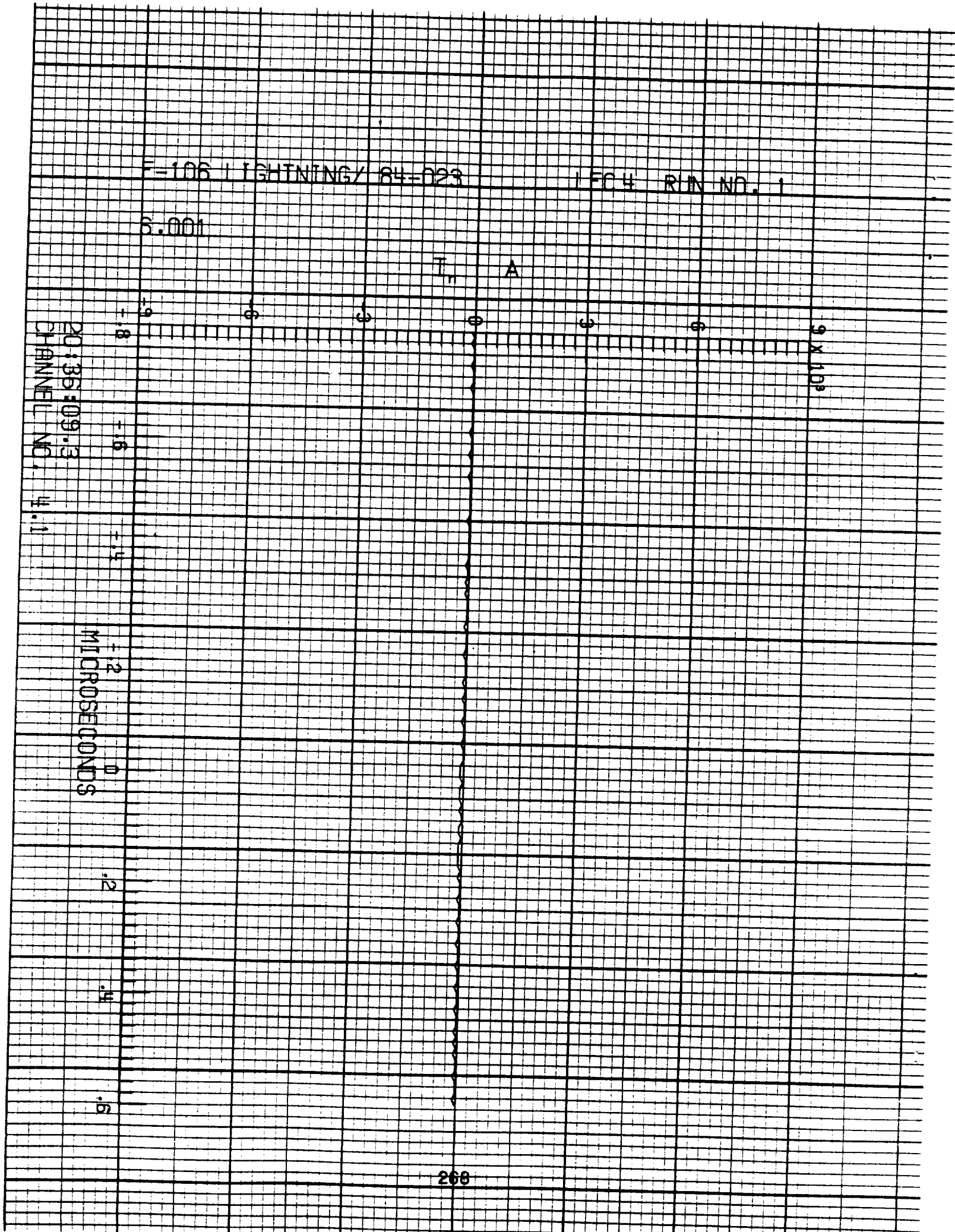
-60 -40 -20 0 20 40 60

-.8 -.6 -.4 -.2 0 .2 .4 .6

MICROSECONDS

20:36:09.3

CHANNEL NO. #10


F-106 LIGHTNING/ 84-023
LFC4 RUN NO. 1
6.001
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
20:36:09.3
CHANNEL NO. 4.1

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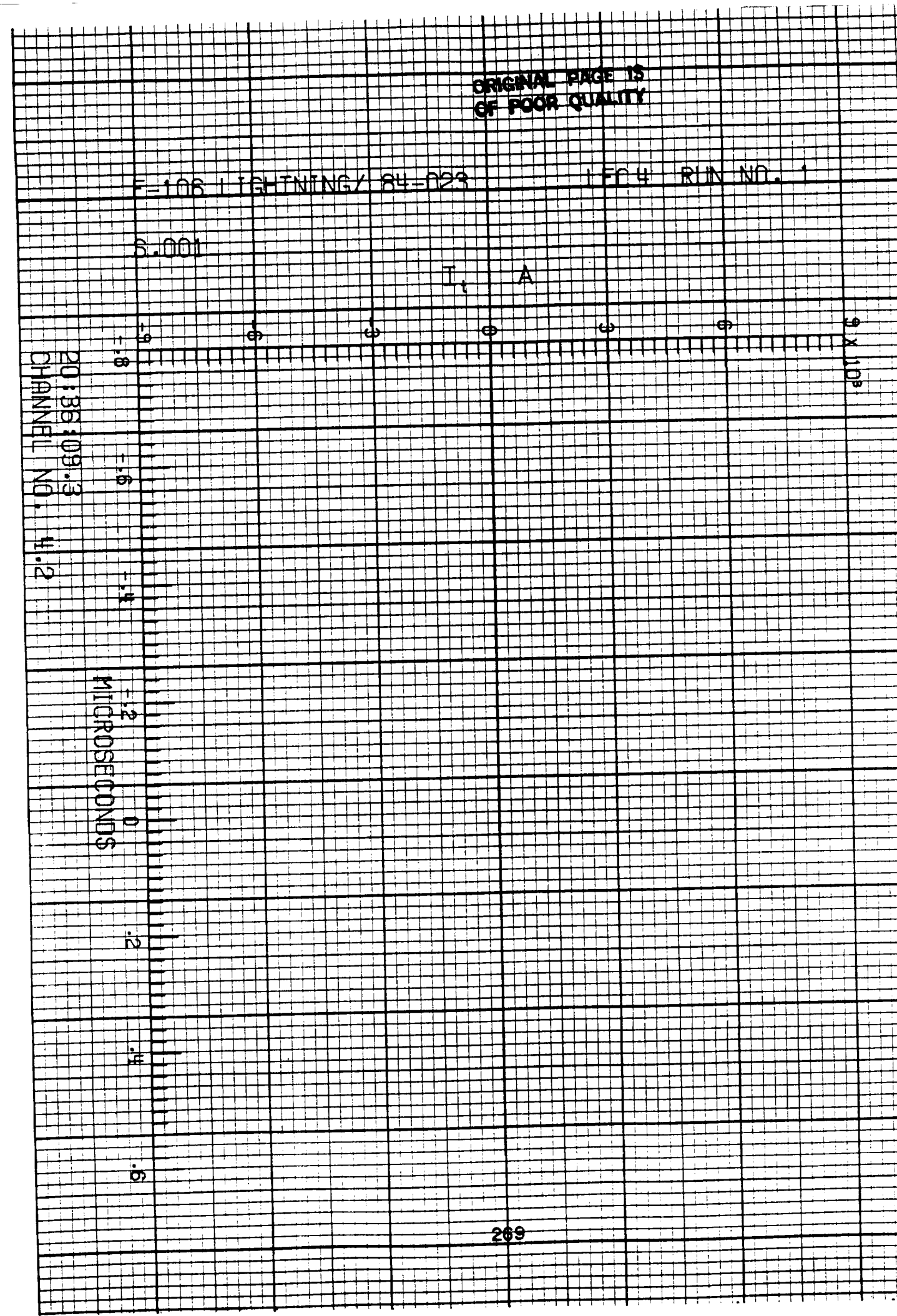

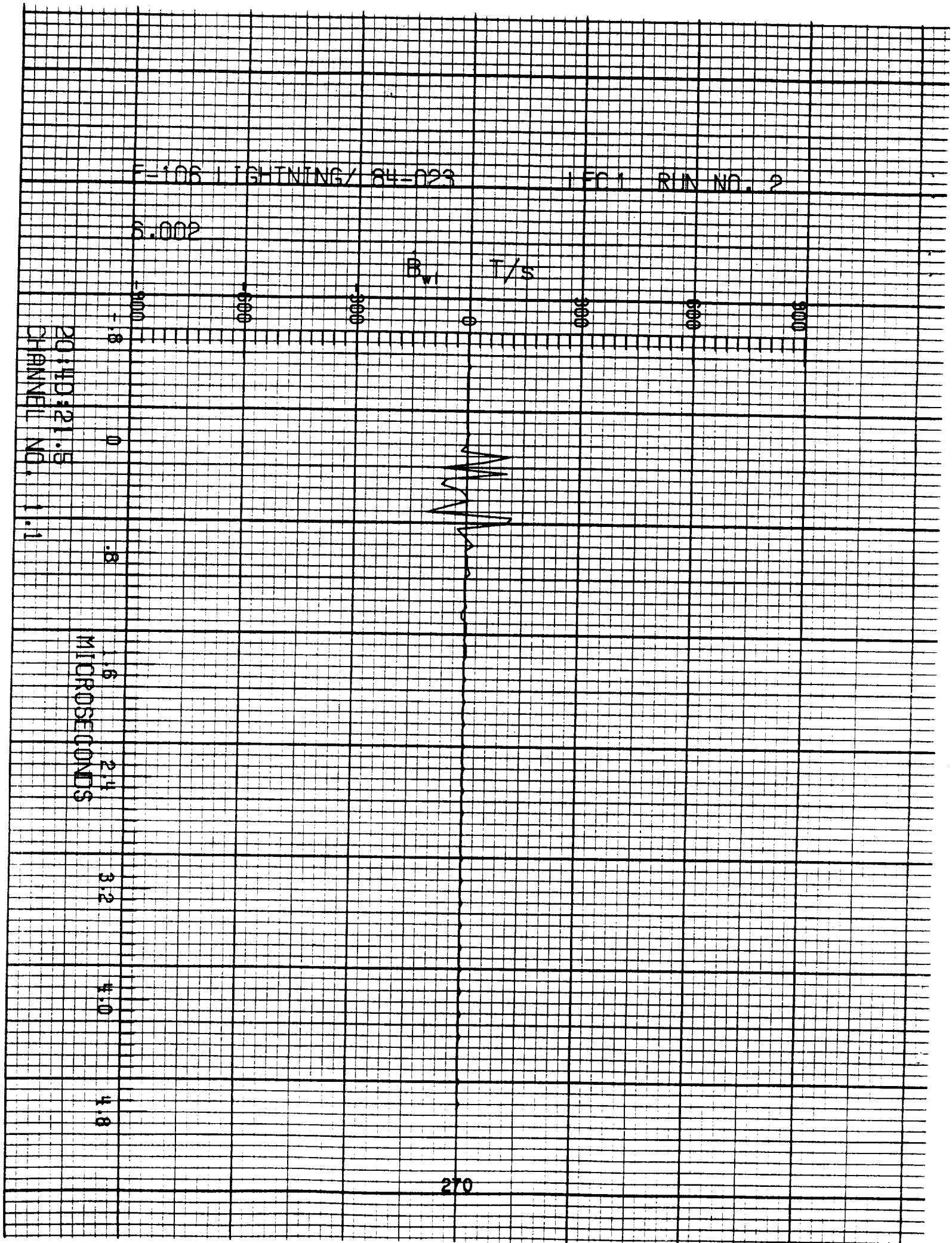
F-106 LIGHTNING/ 84-023
LFC1 RUN NO. 2
6.002
B_{wi} T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
20:40:21.5
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-023 IFC 1 RUN NO. 2

6.002

$\hat{B}_{wr}$ T/s

-600 -400 -200 0 200 400 600

20:10:21.5

CHANNEL NO. 1.2

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

F-106 LIGHTNING/ 84-023 IFC2 RUN NO. 2

5.002

$\vec{D}_t$ A/m²

-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:40:21.5

CHANNEL NO. 2.0

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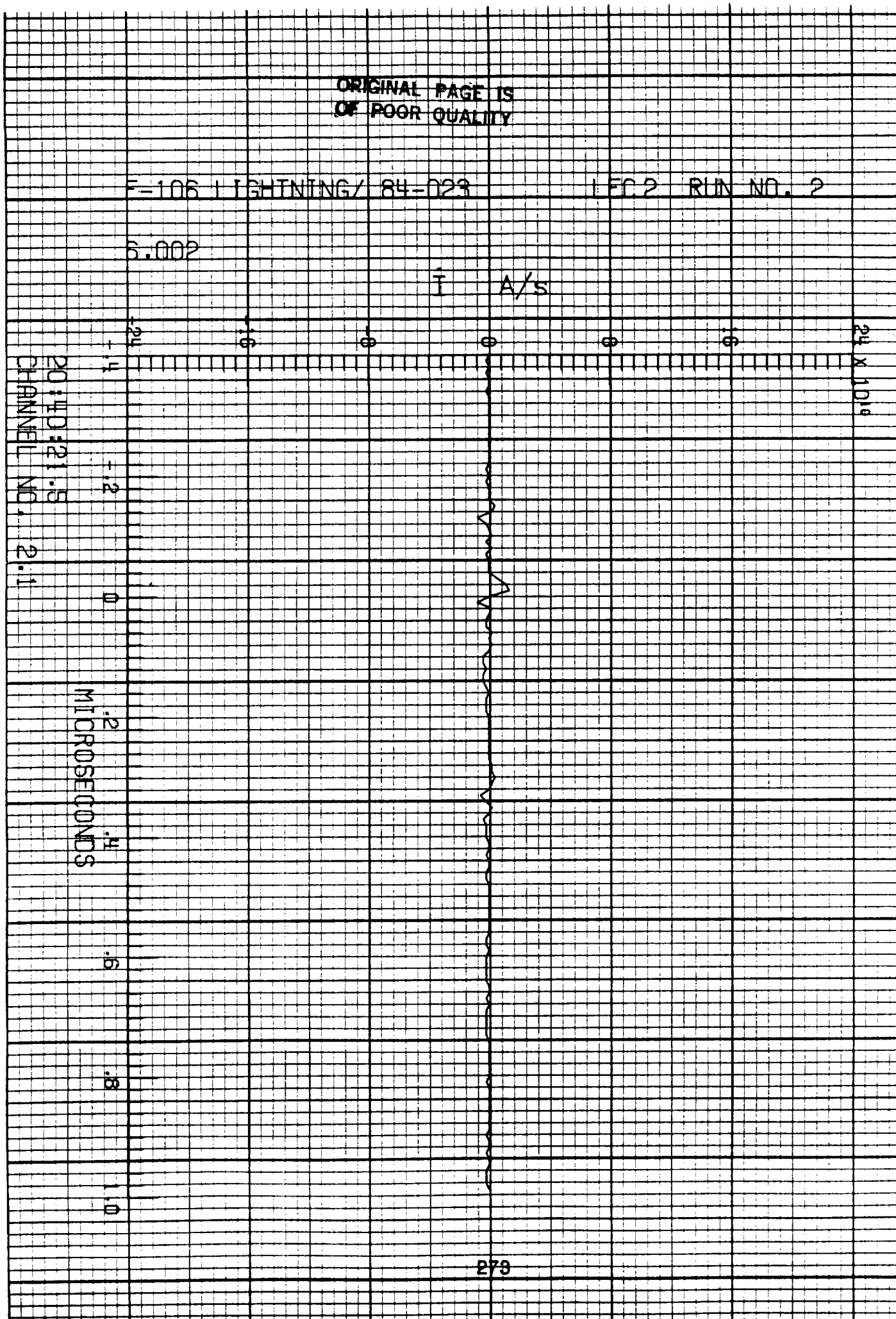
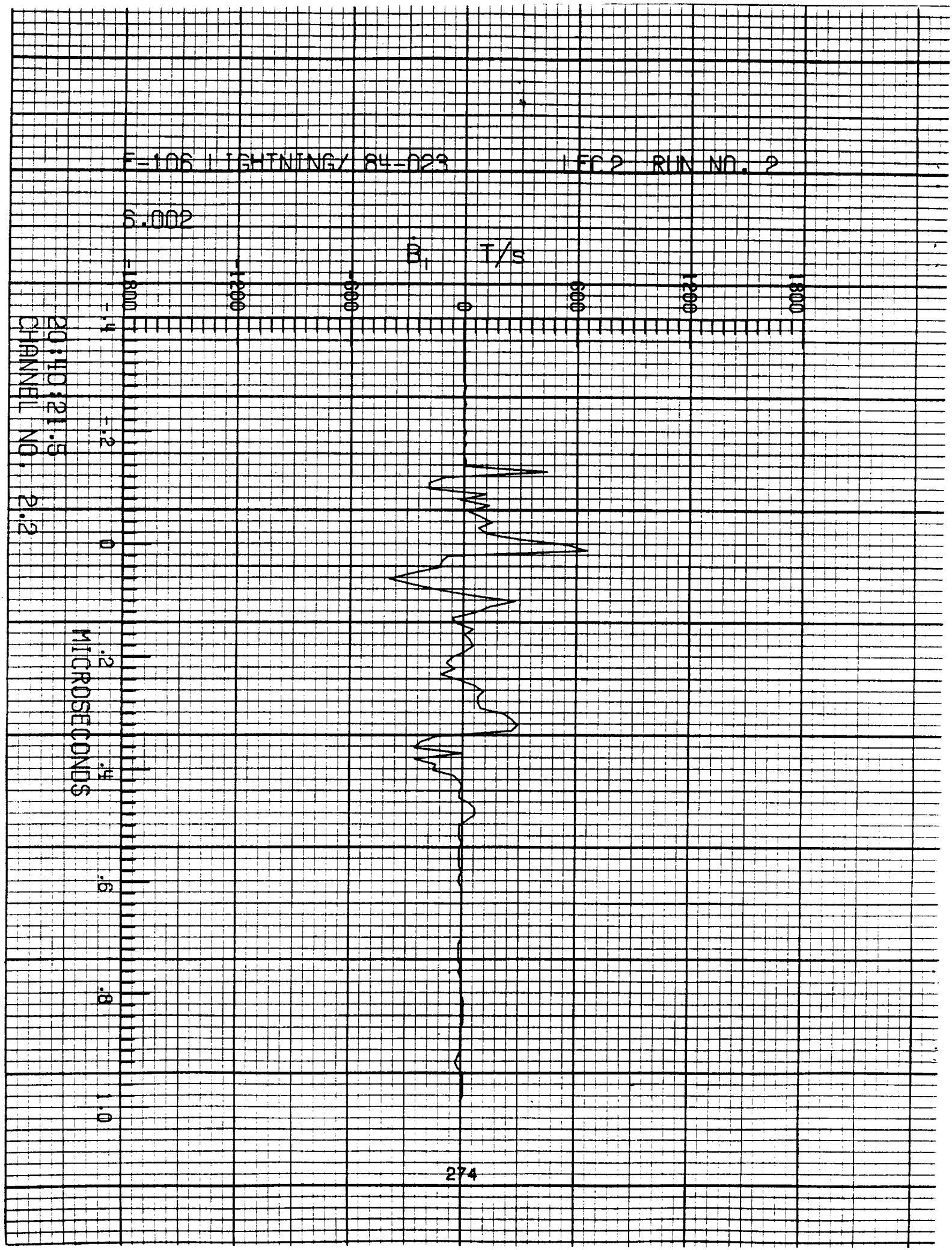
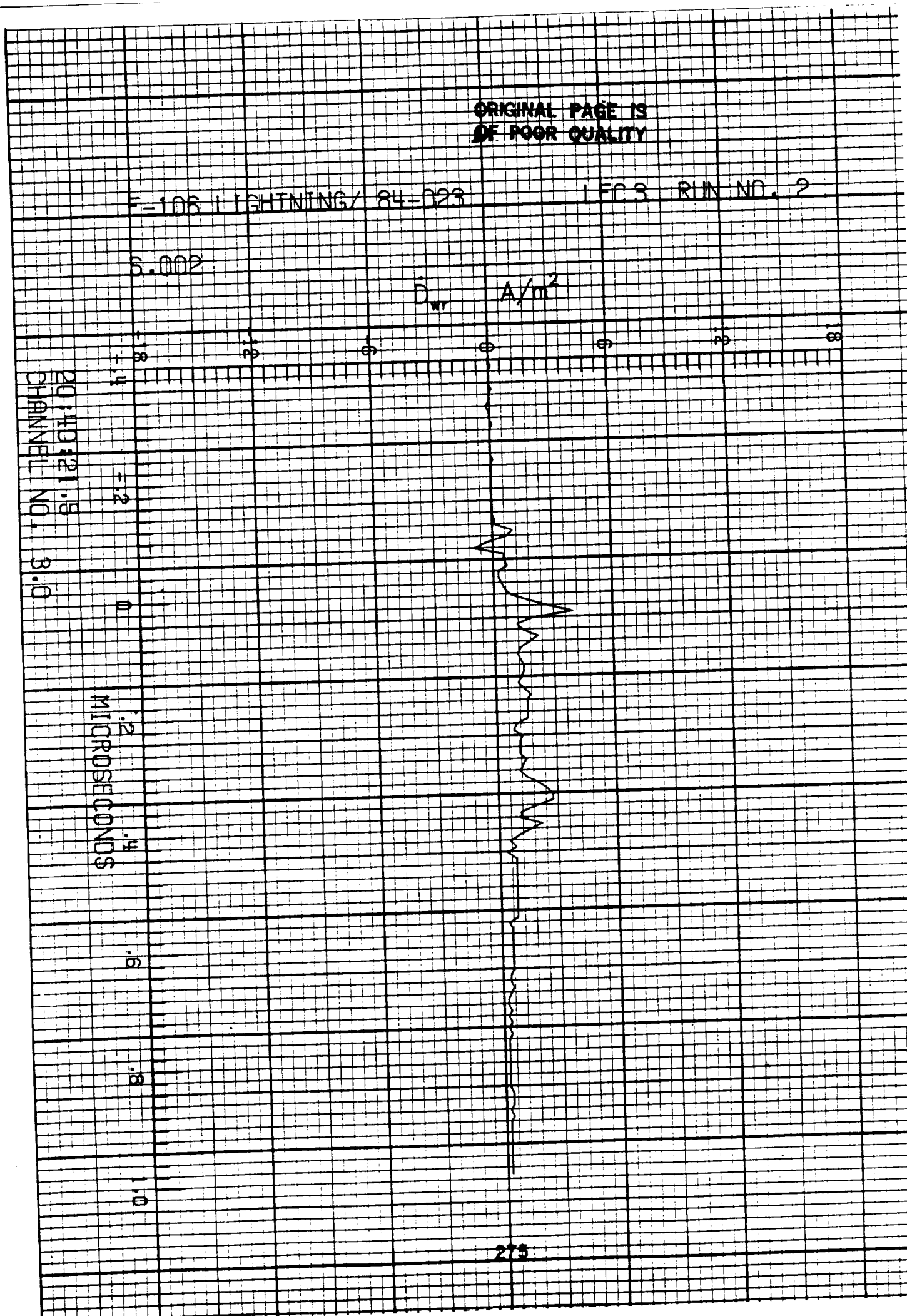



F-106 LIGHTNING/ 84-023
LEC 2 RUN NO. 2
6.002
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:40:21.5
CHANNEL NO. 2.2

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-023 LEC 3 RUN NO. 2

6.002

D_{w1} A/m^2

-18 -12 -6 0 6 12 18

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4

MICROSECONDS

CHANNEL NO. 8.1

20:40:21.6

ORIGINAL PAGE IS
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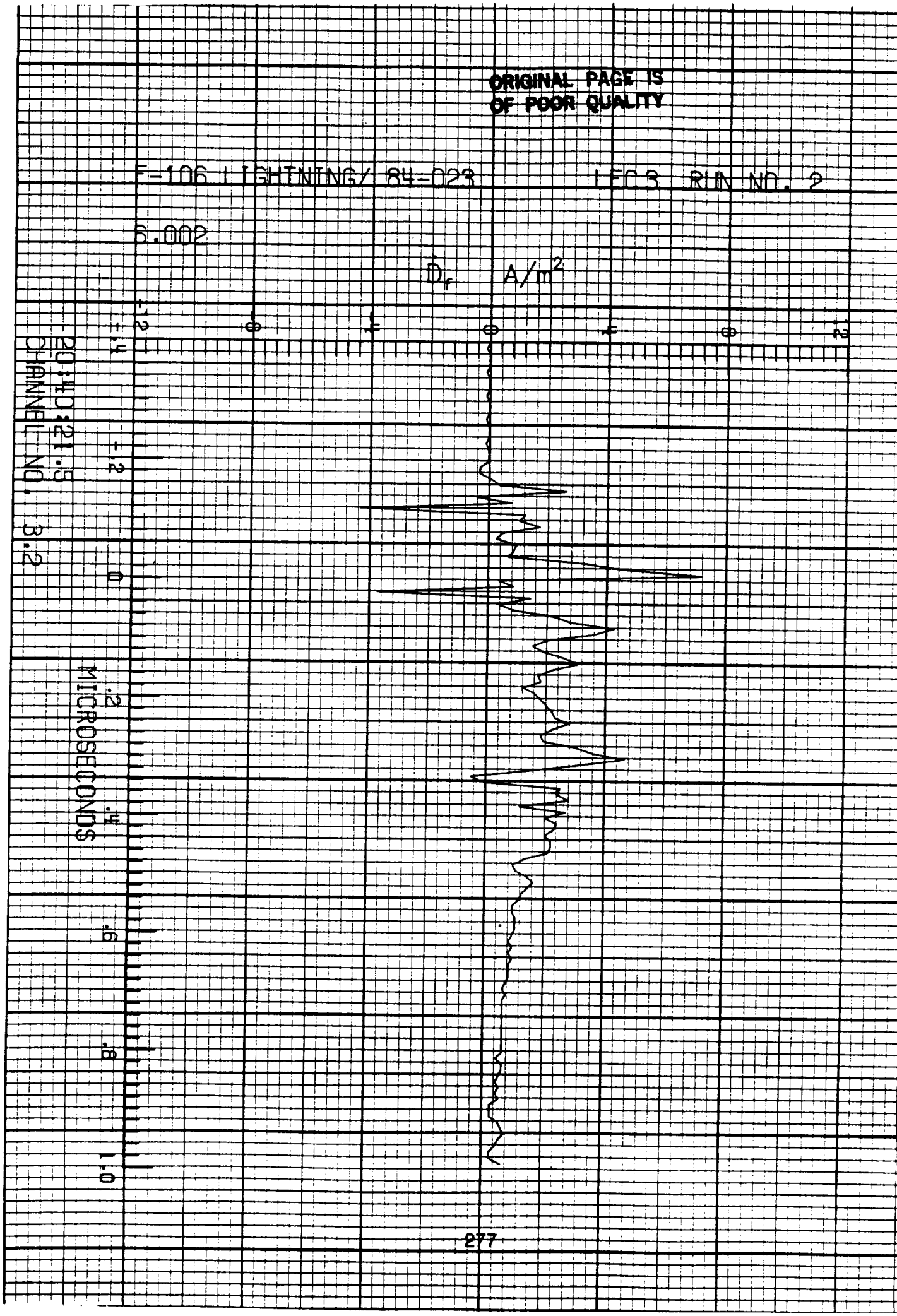
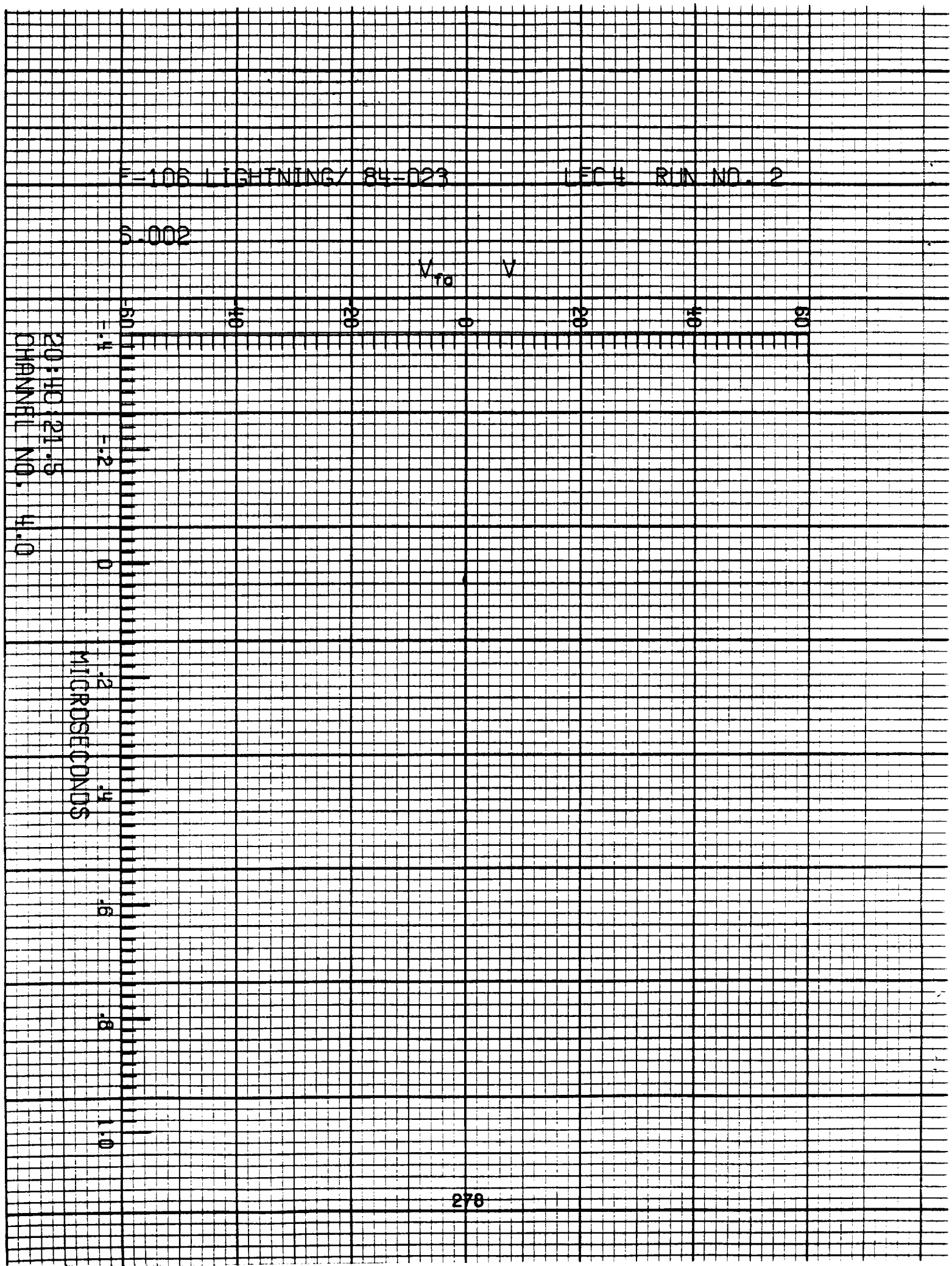
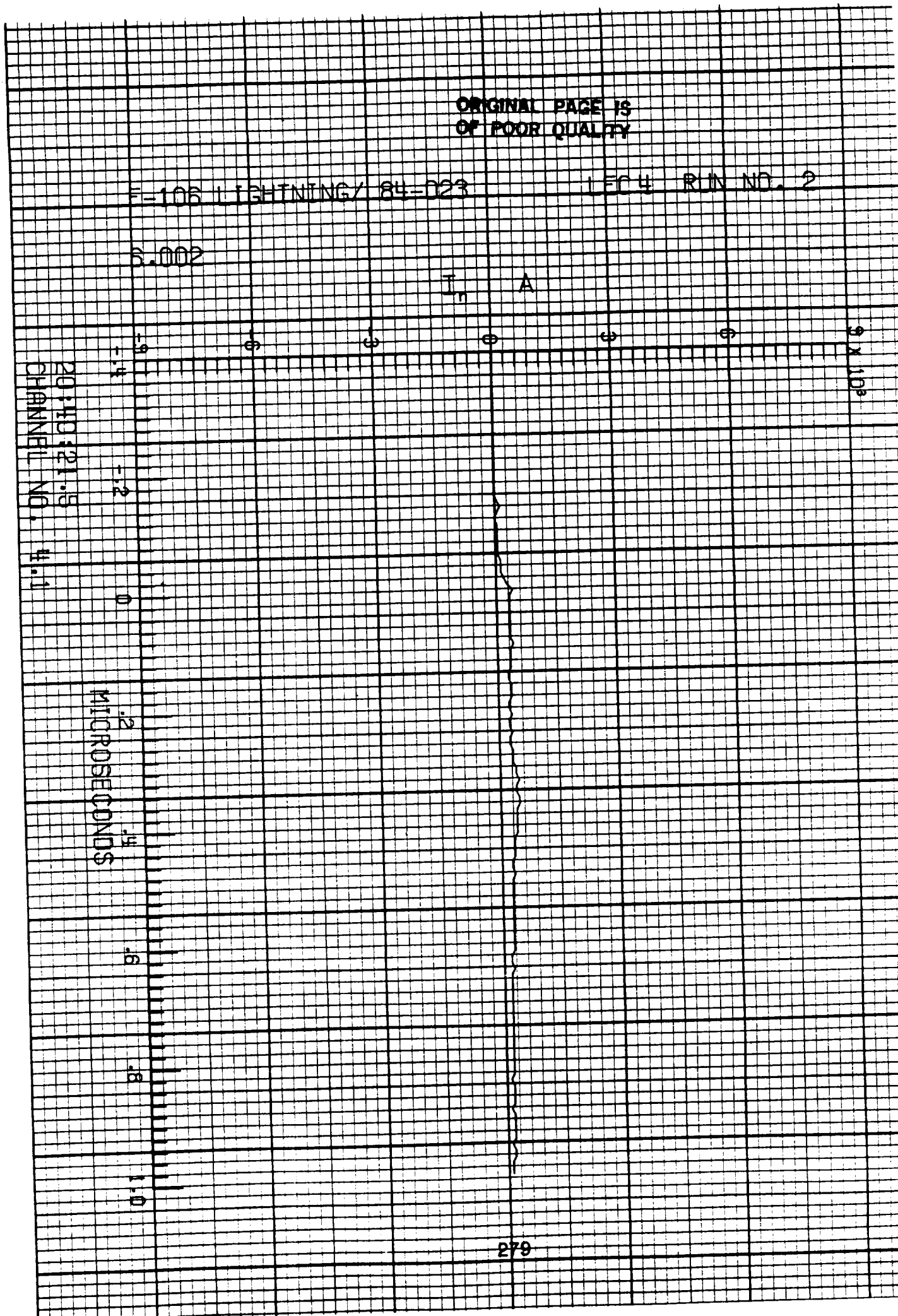
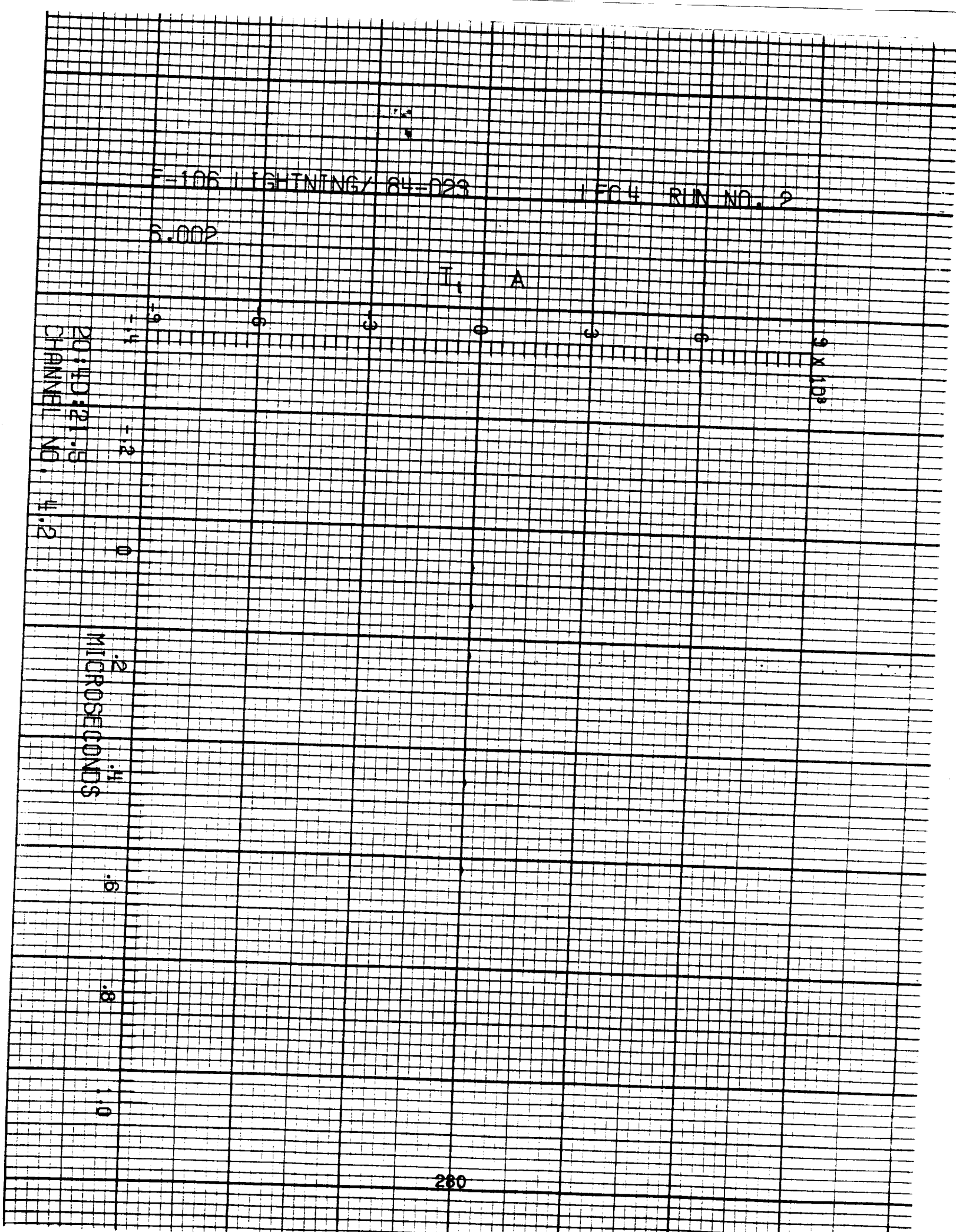



F-106 LIGHTNING/ 84-023
LEC 4 RUN NO. 2
6.002
V_{ra} V
-60
-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:HO 21:S
CHANNEL NO. 4.0

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-023
LFC4 RUN NO. 2
6.002
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:40:21.5
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY

F=106 LIGHTNING/ 84-024 LEC 1 RUN NO. 1

N.001

$\dot{B}_{wi}$ T/S

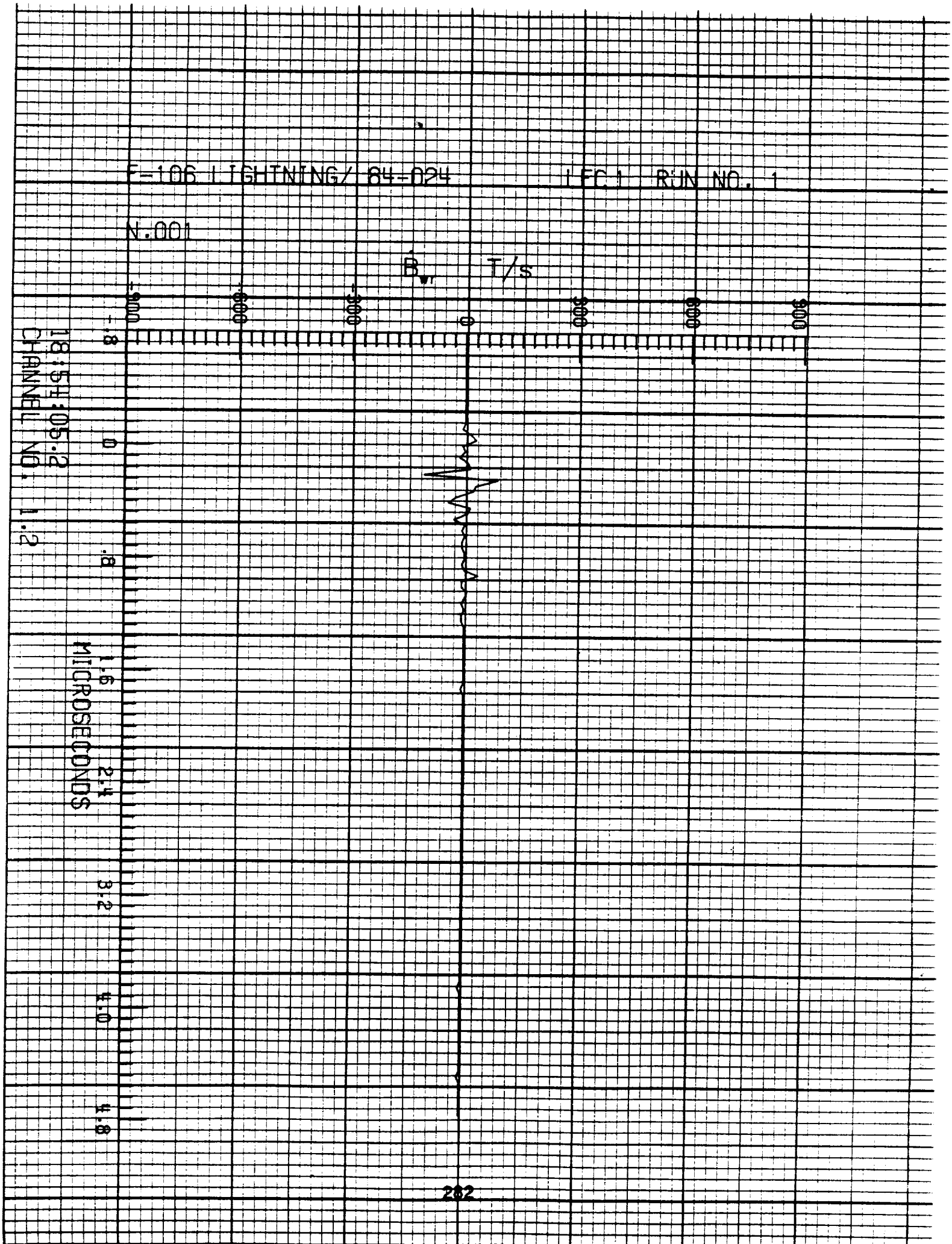
-800 -600 -400 -200 0 200 400 600 800

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

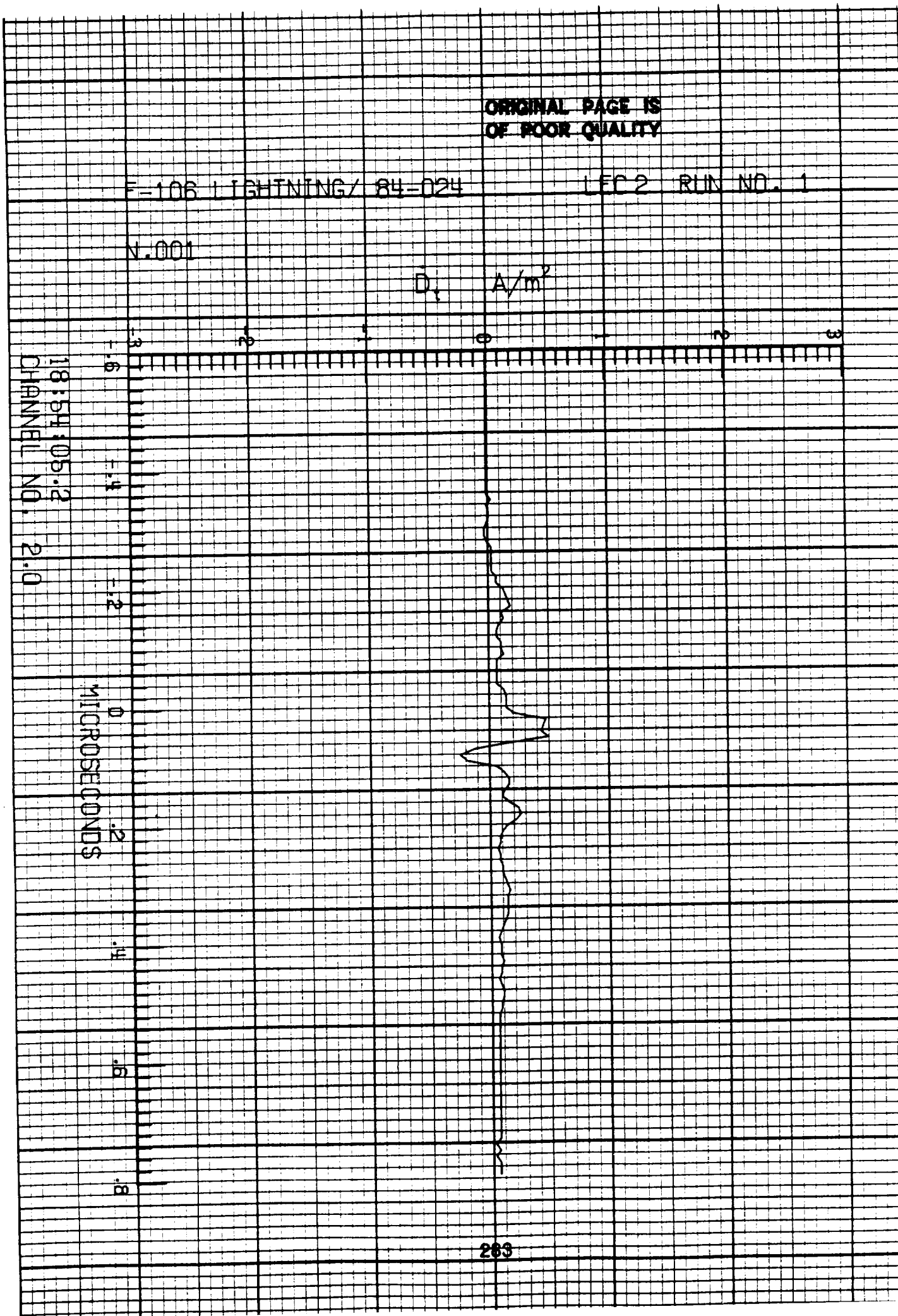
MICROSECONDS

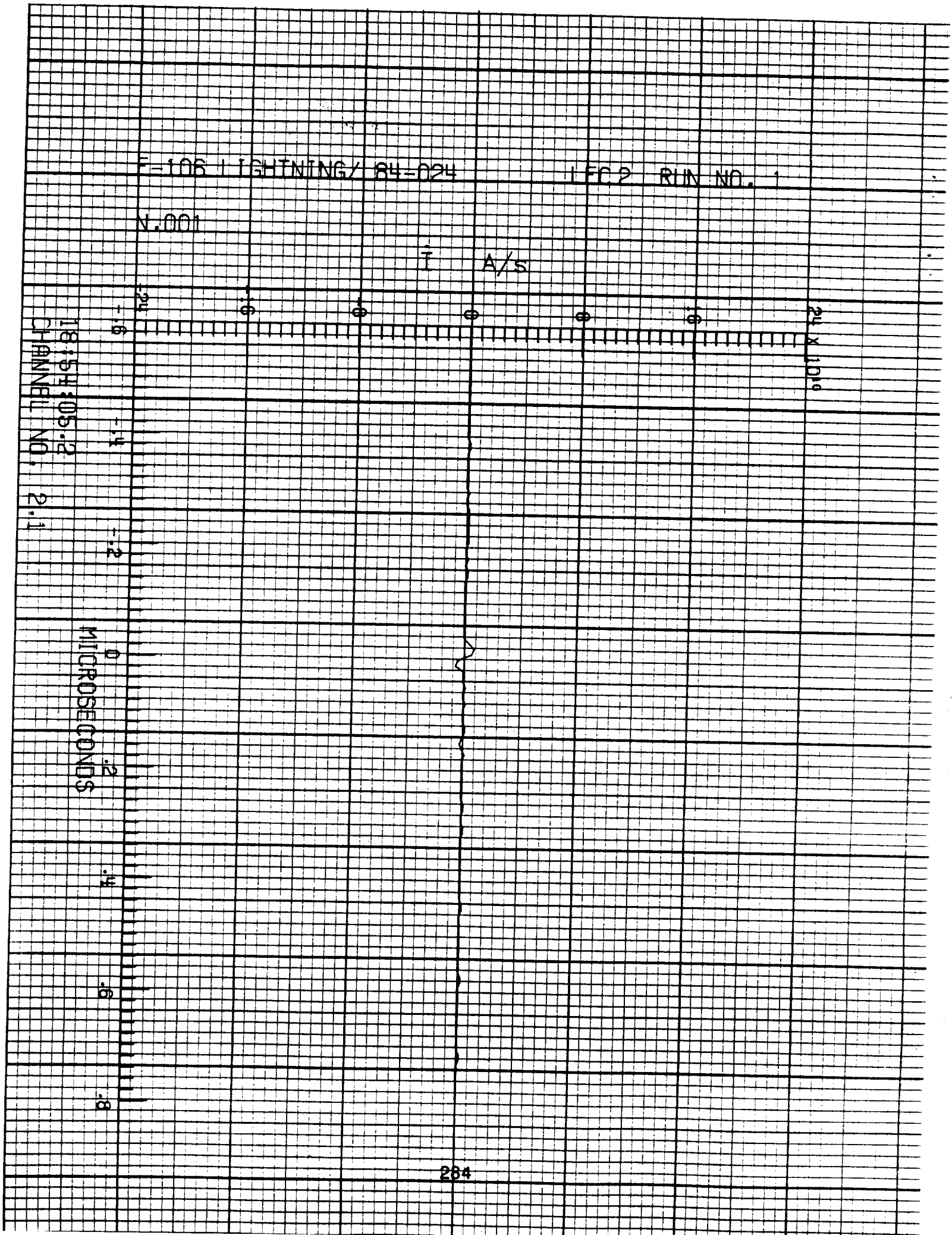
CHANNEL NO. 1 18:54:05.2

1:1


F-106 LIGHTNING/ 84-024
LFC1 RUN NO. 1
N.001
$\dot{B}_{wr}$ T/s
-800
-600
-400
-200
0
200
400
600
800
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
18:54:05.52
CHANNEL NO. 1.2

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LFC2 RUN NO. 1
N.001
Ī A/s
-24
-16
-8
0
8
16
24 x 10^10
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
18:54:05.2
CHANNEL NO. 2.1

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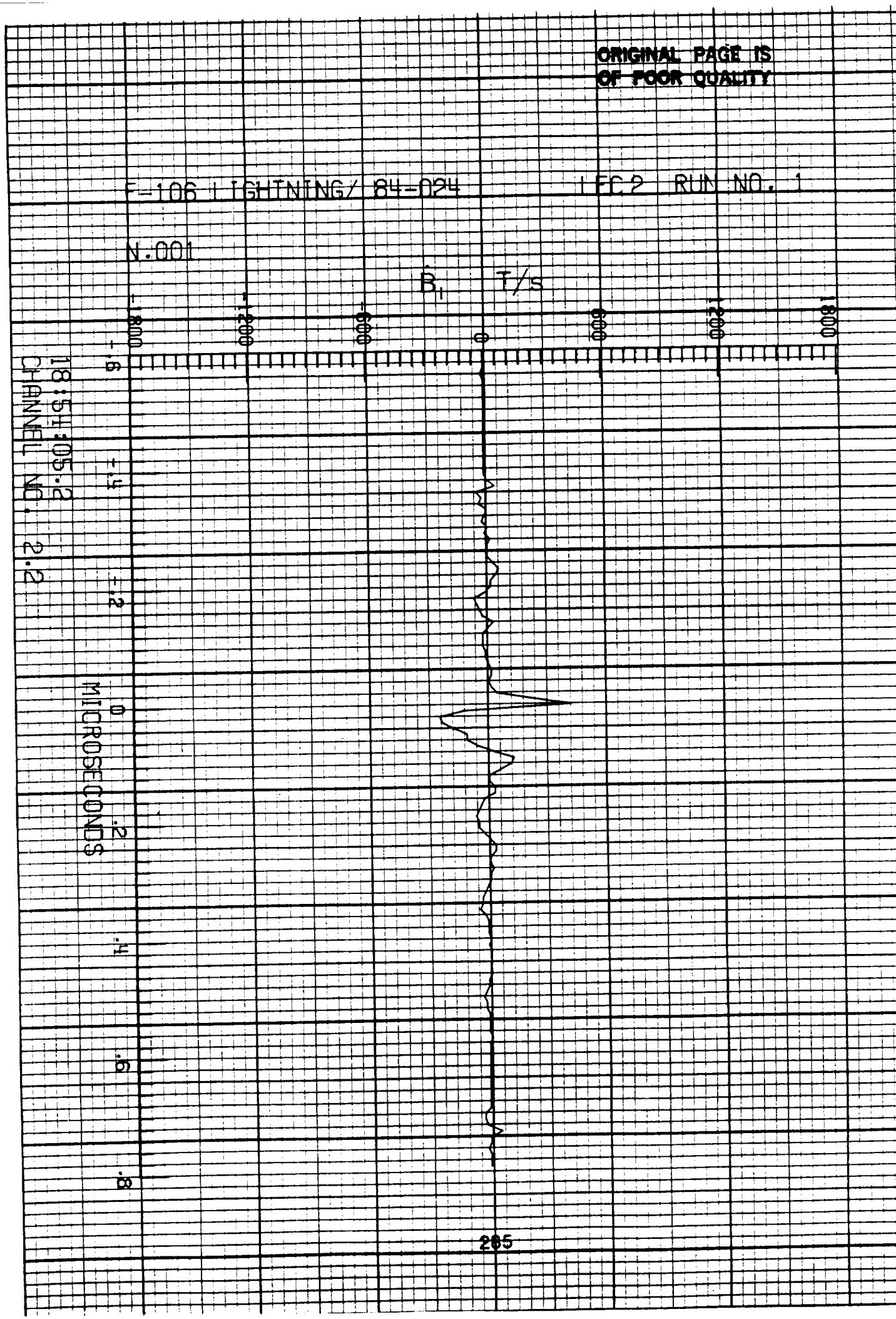
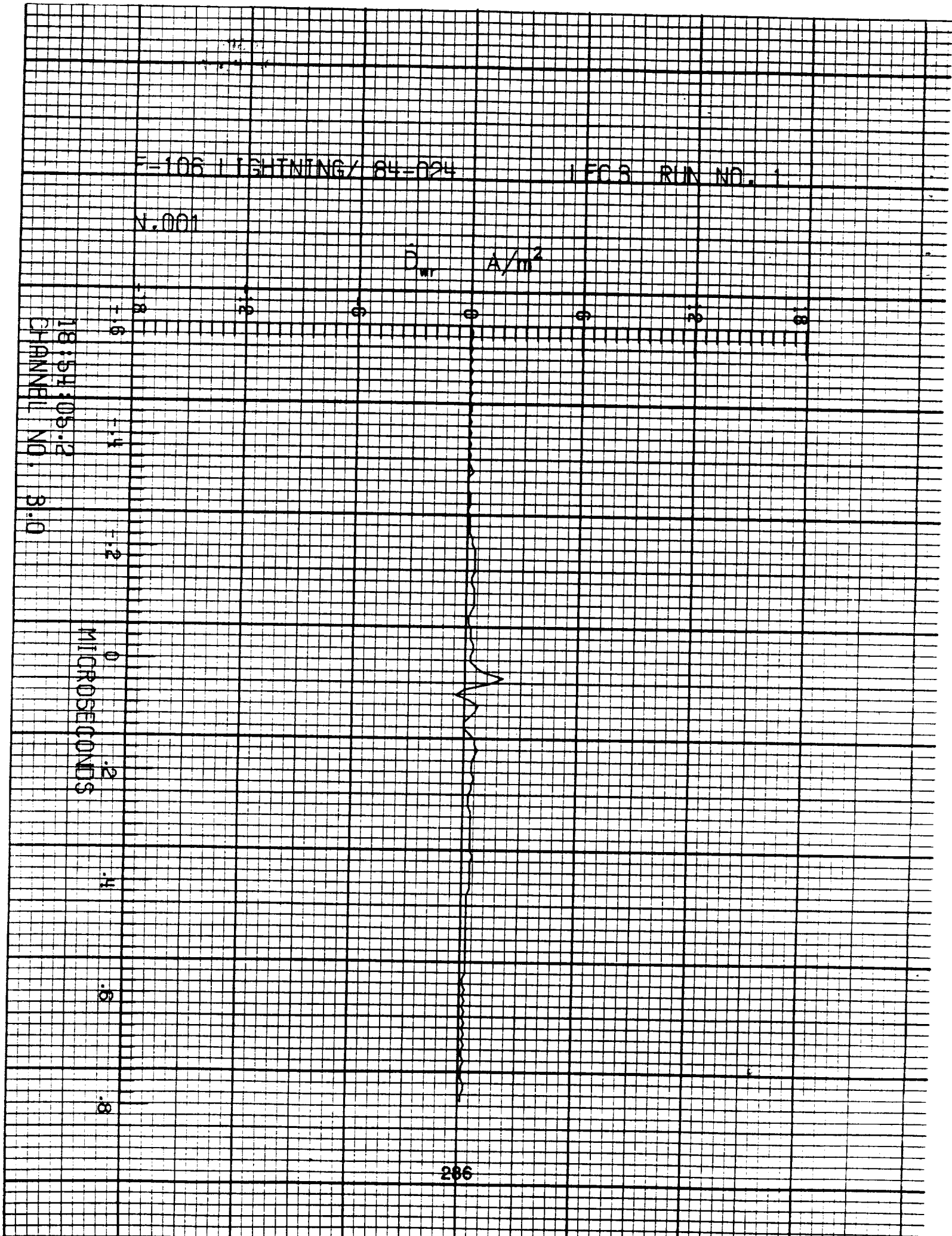
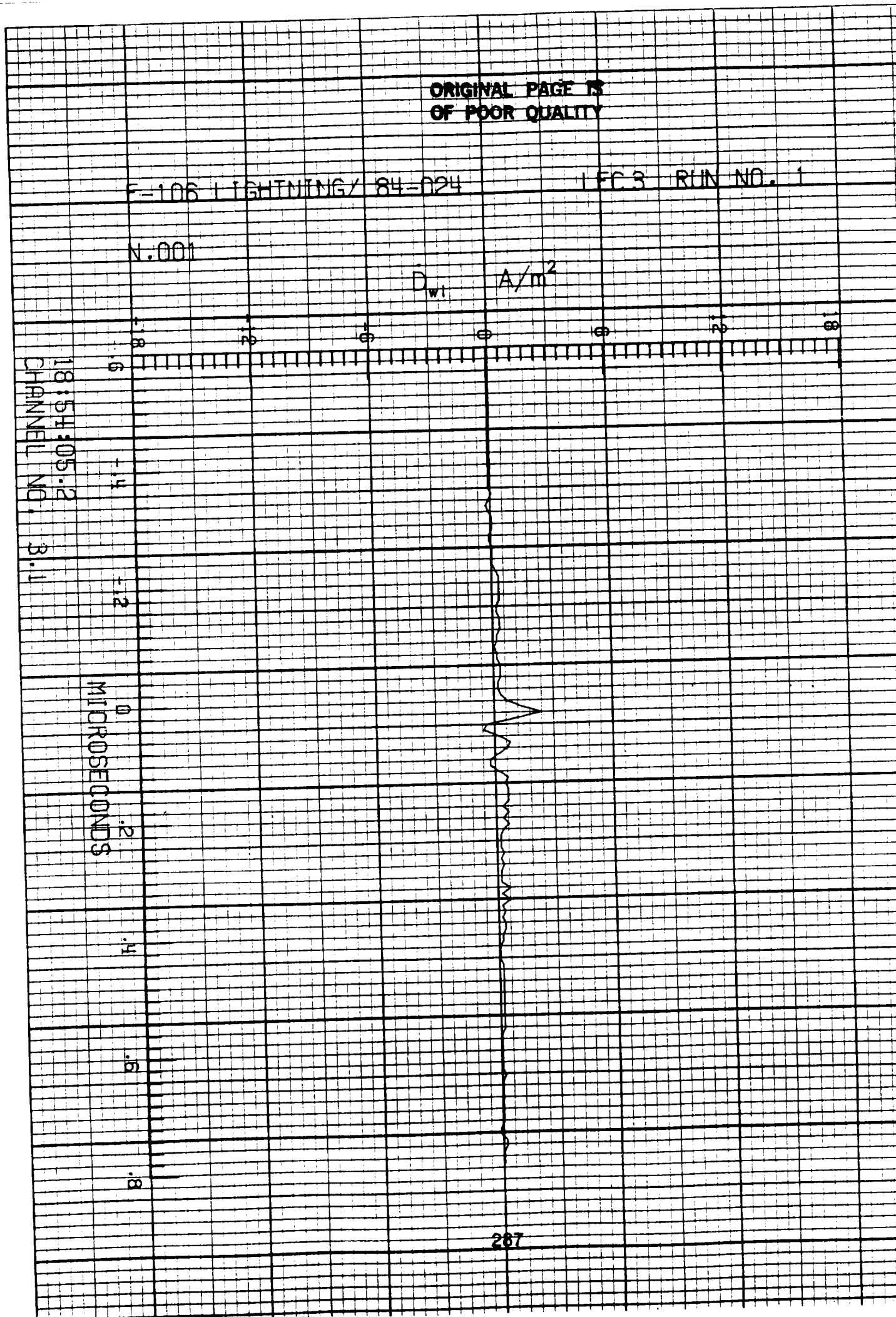
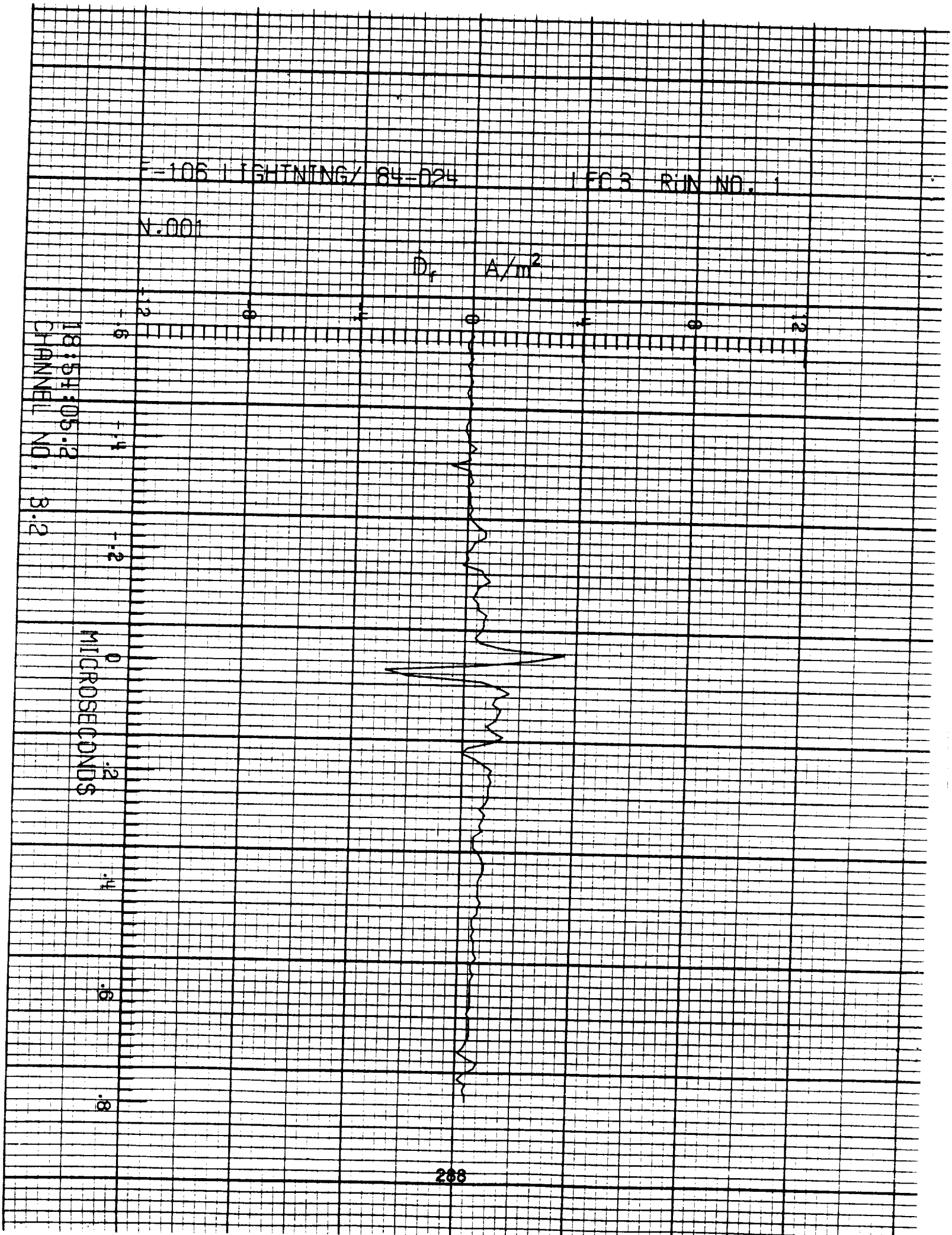
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LEC3 RUN NO. 1
N.001
$\dot{D}_{wr}$ A/m^2
-.8
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
18:54:05.2
CHANNEL NO. 3.0

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LFC3 RUN NO. 1
N.001
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
18:54:05.2
CHANNEL NO. 3.2

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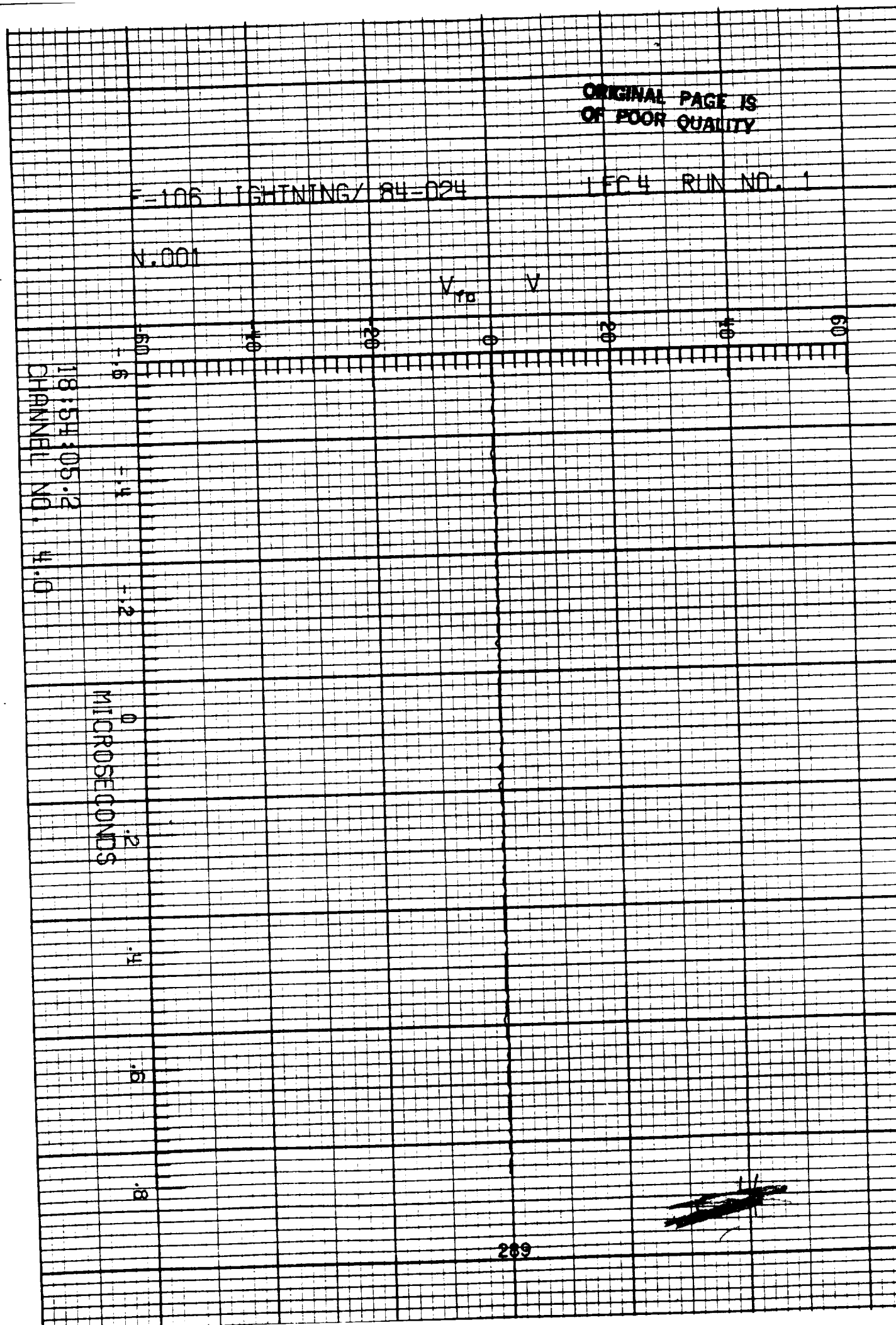

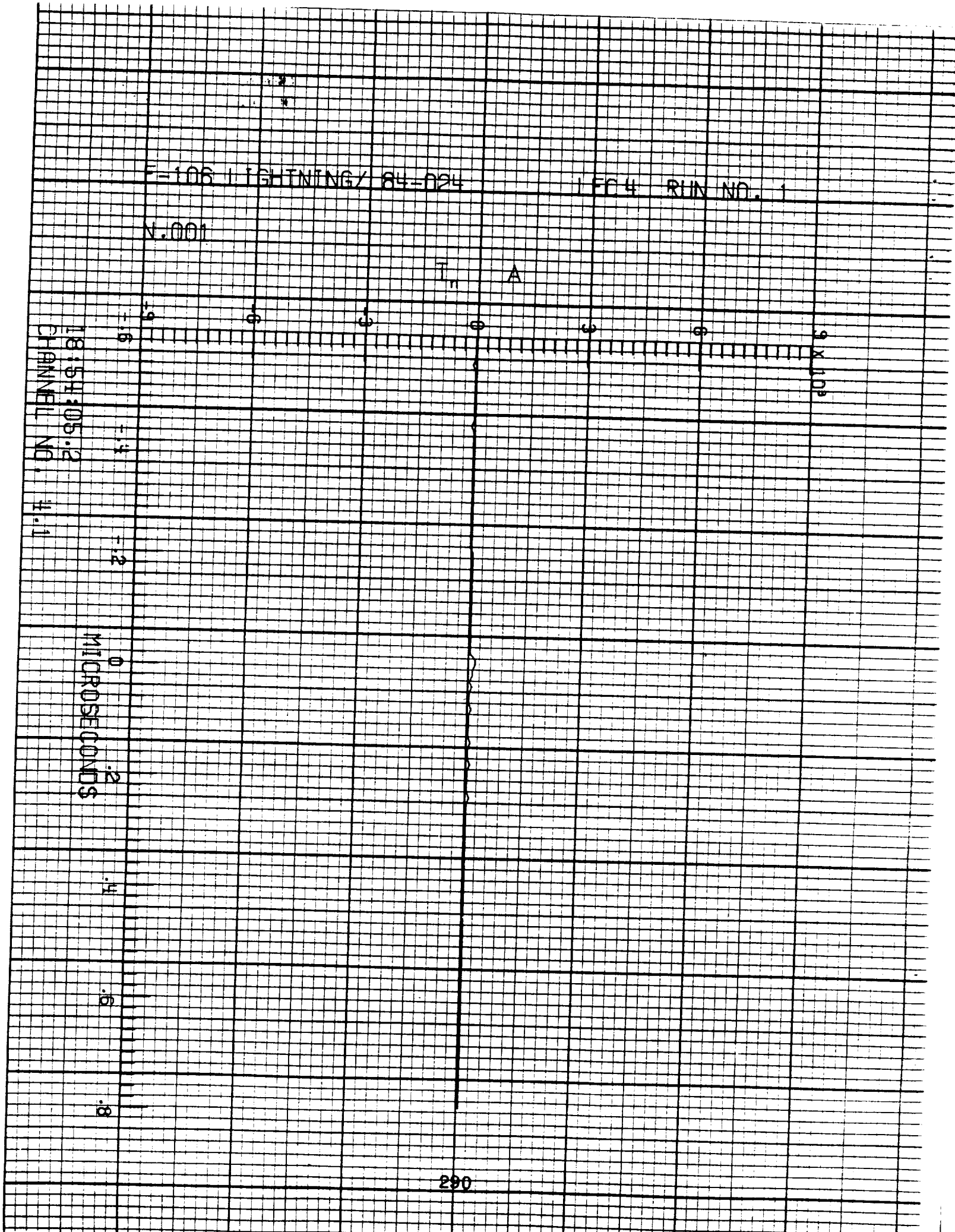
F-106 LIGHTNING/ 84-024
LFC 4 RUN NO. 1
N.001
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
18:54:05.2
CHANNEL NO. 4.1

ORIGINAL PAGE IS
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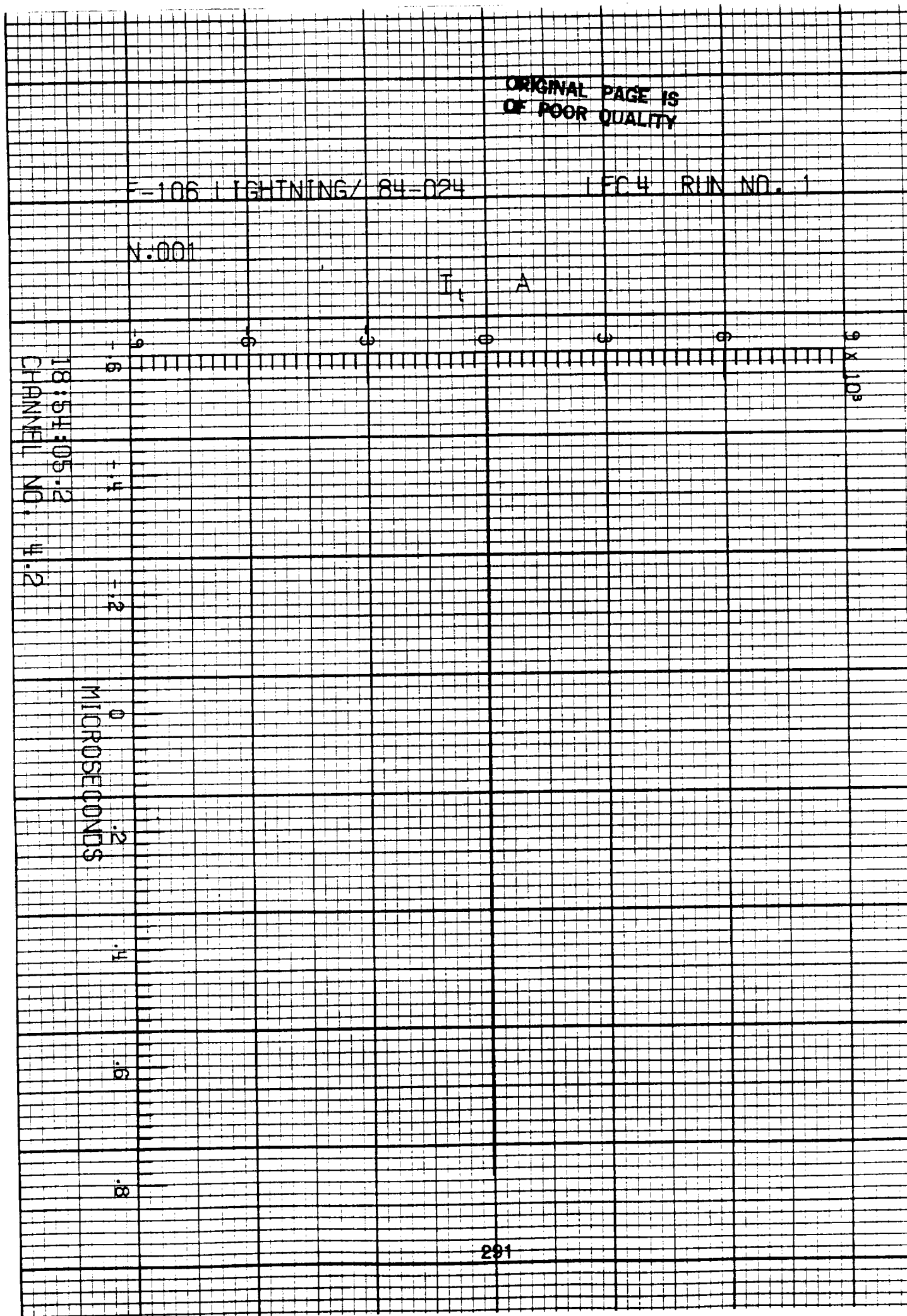
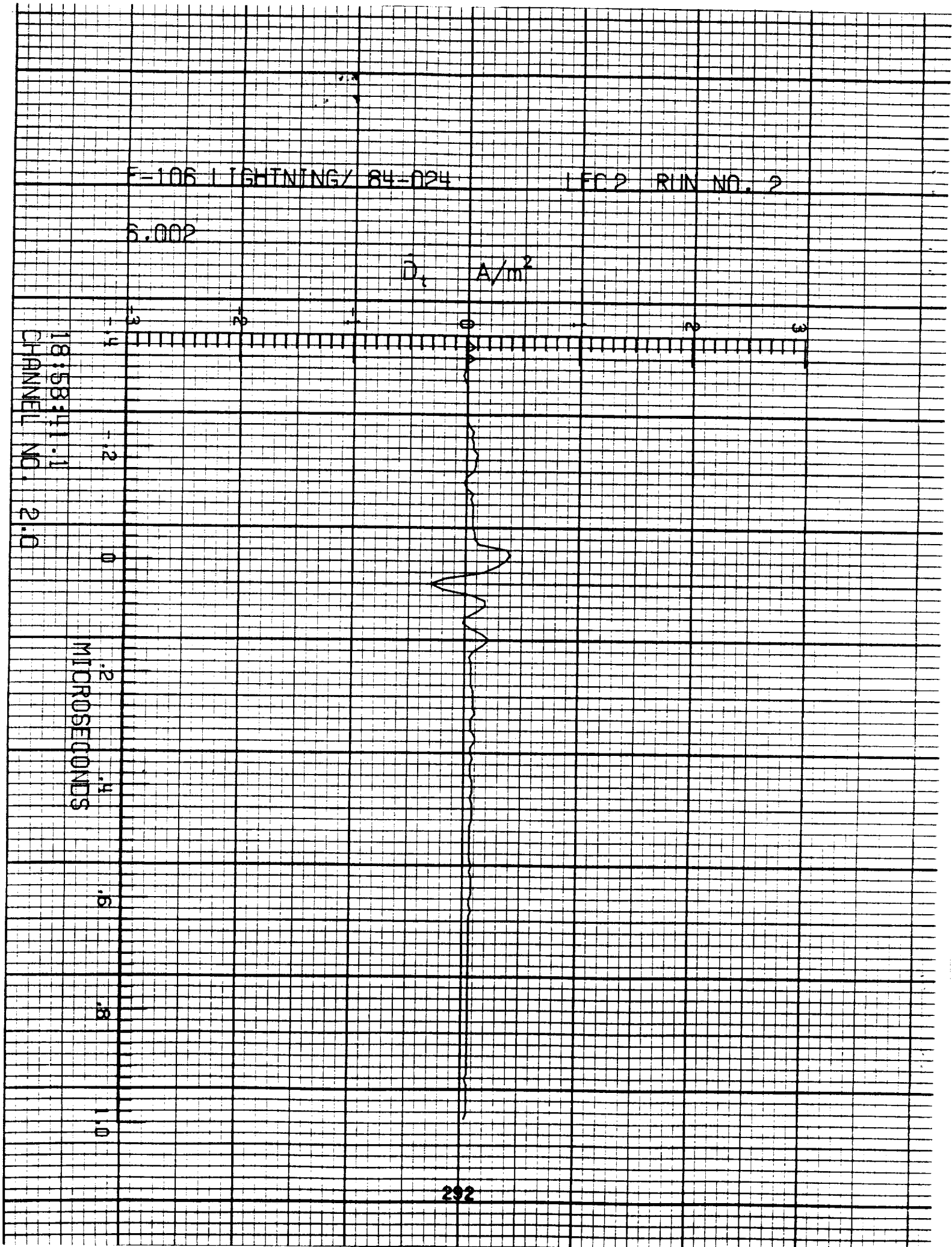
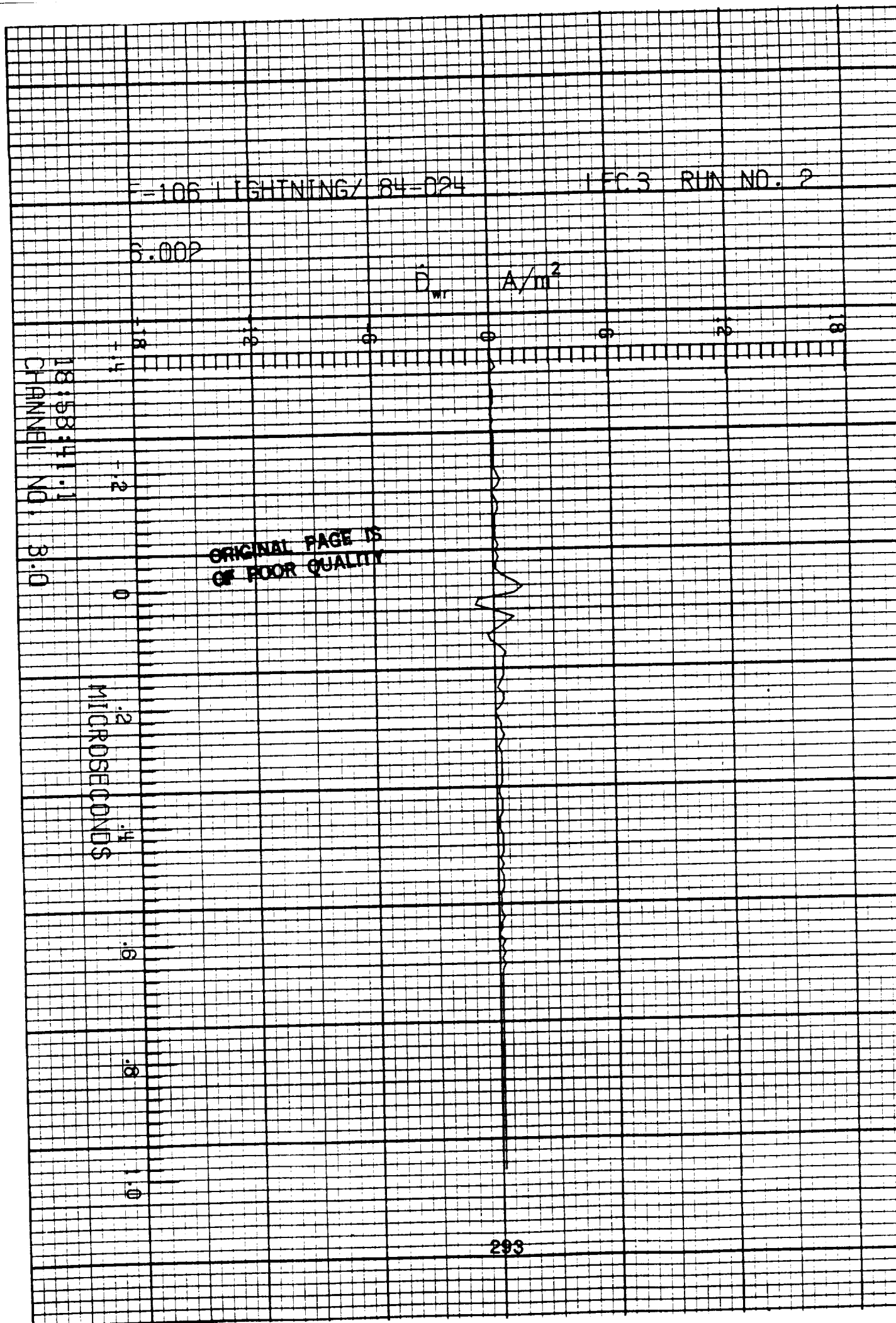



F-106 LIGHTNING/ 84-024
LFC2 RUN NO. 2
6.002
$\dot{D}_t$ A/m^2
-3
-2
-1
0
1
2
3
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
18:58:41.1
CHANNEL NO. 2.0



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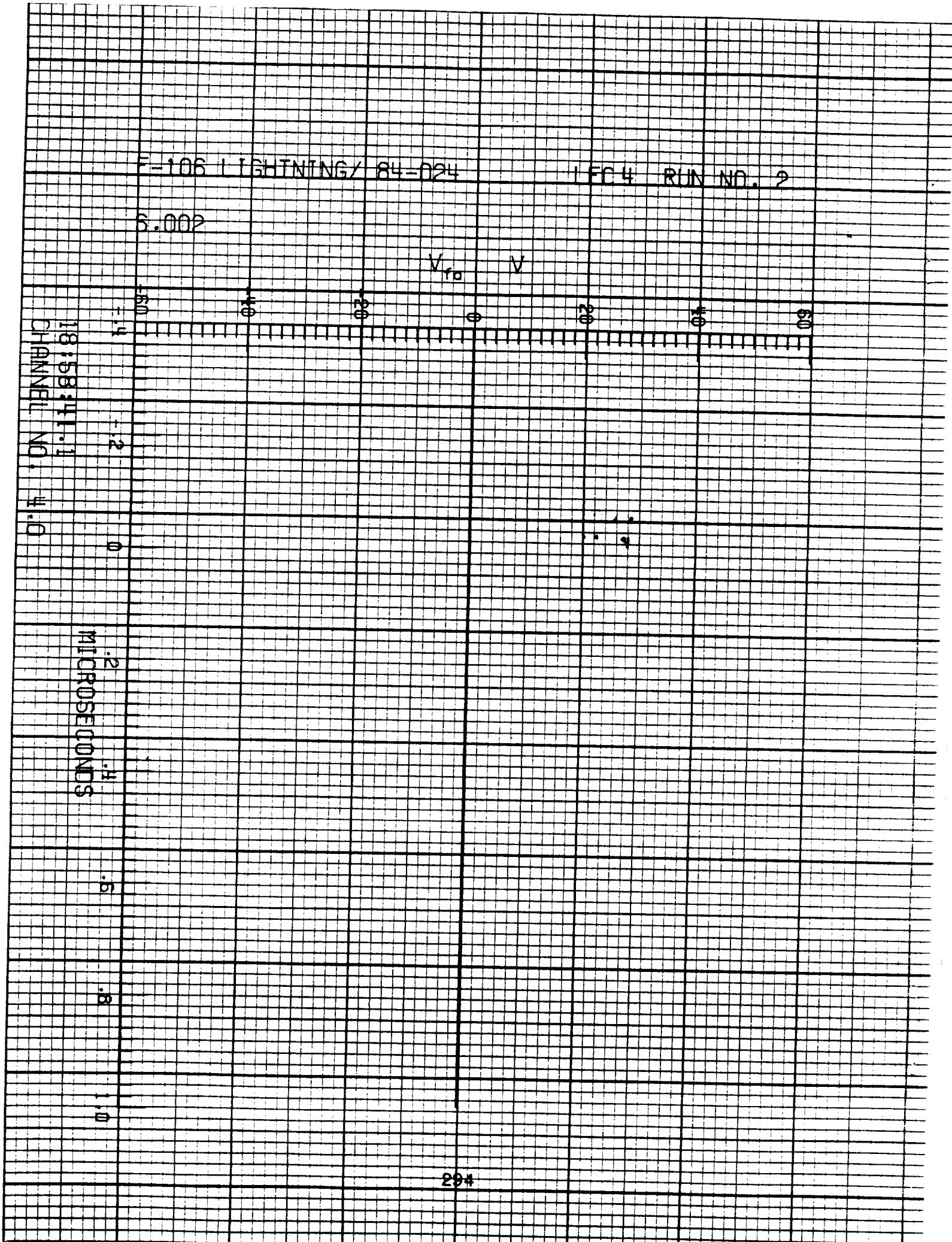
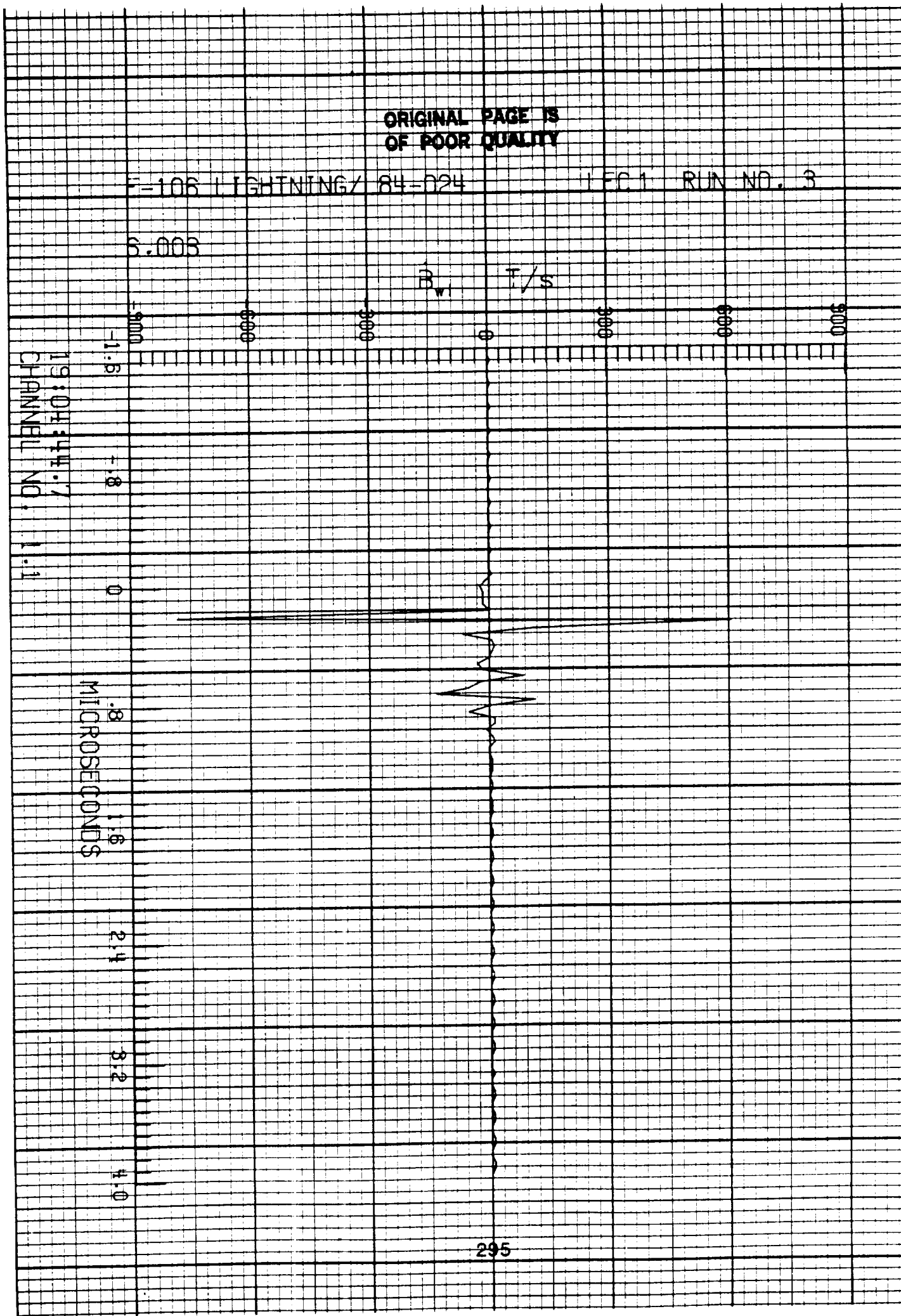
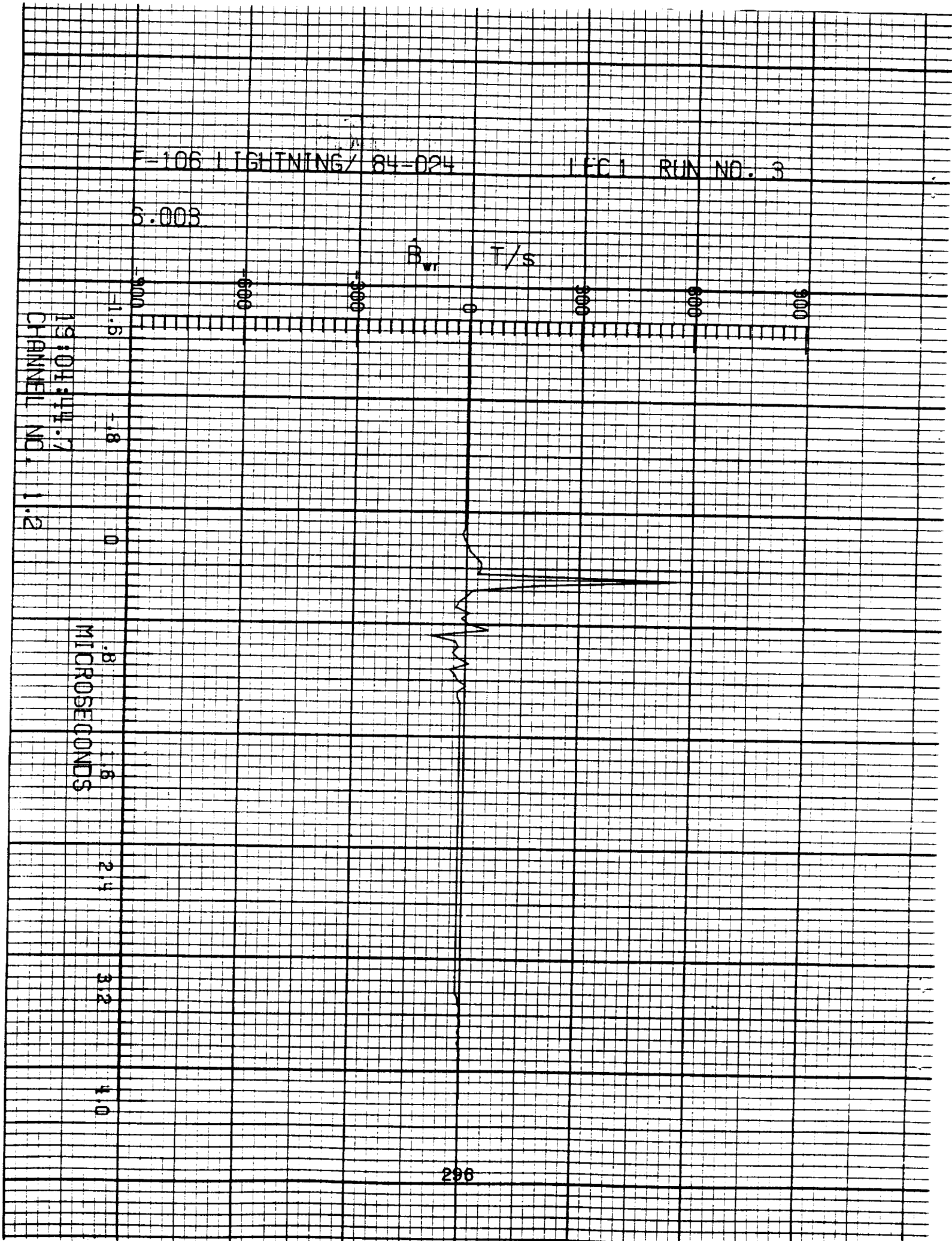
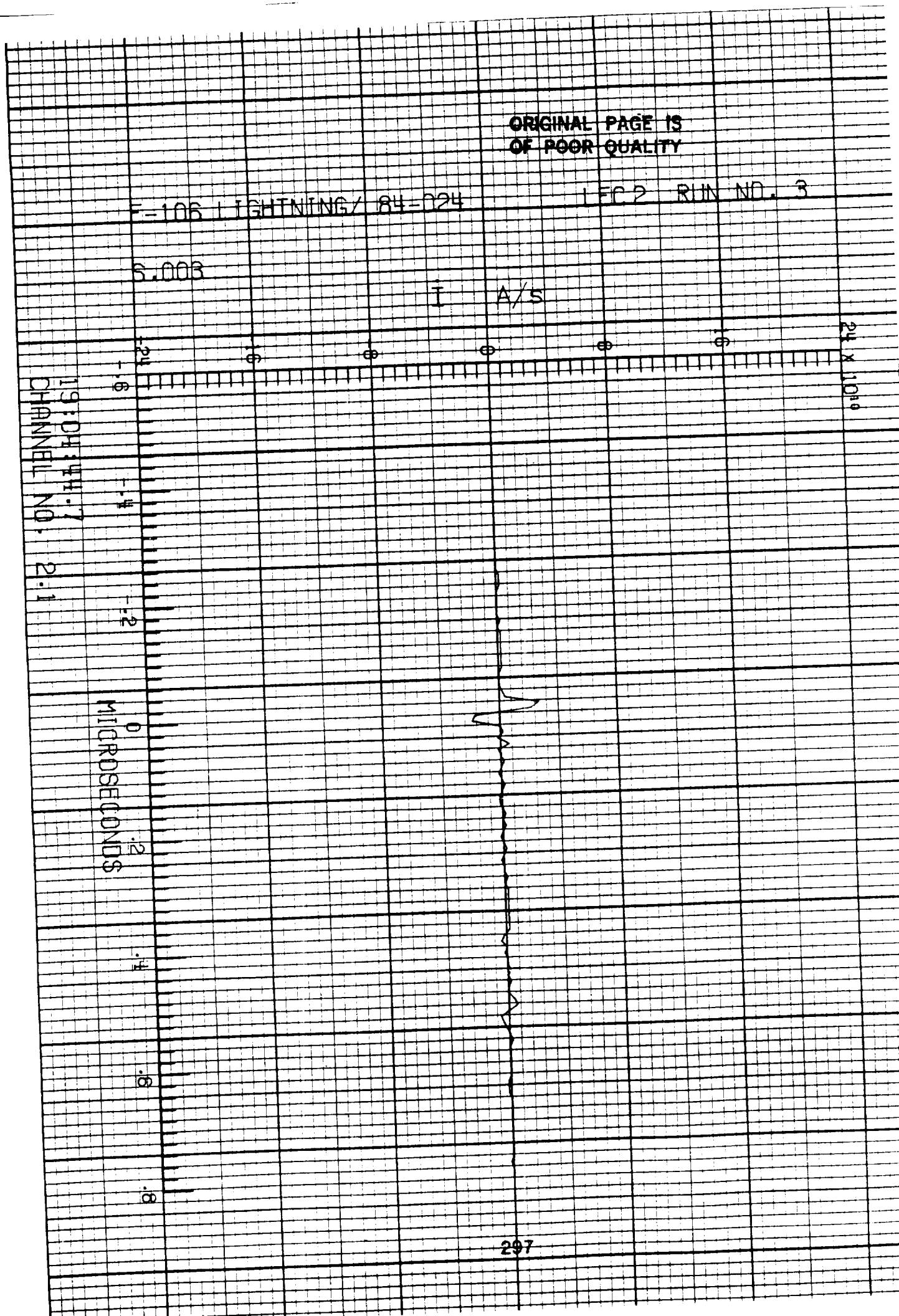

F-106 LIGHTNING/ 84-024
LFC 4 RUN NO. 2
6.002
V_{fo} V
-60
-40
-20
0
20
40
60
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
18:58:41.1
CHANNEL NO. 4.0

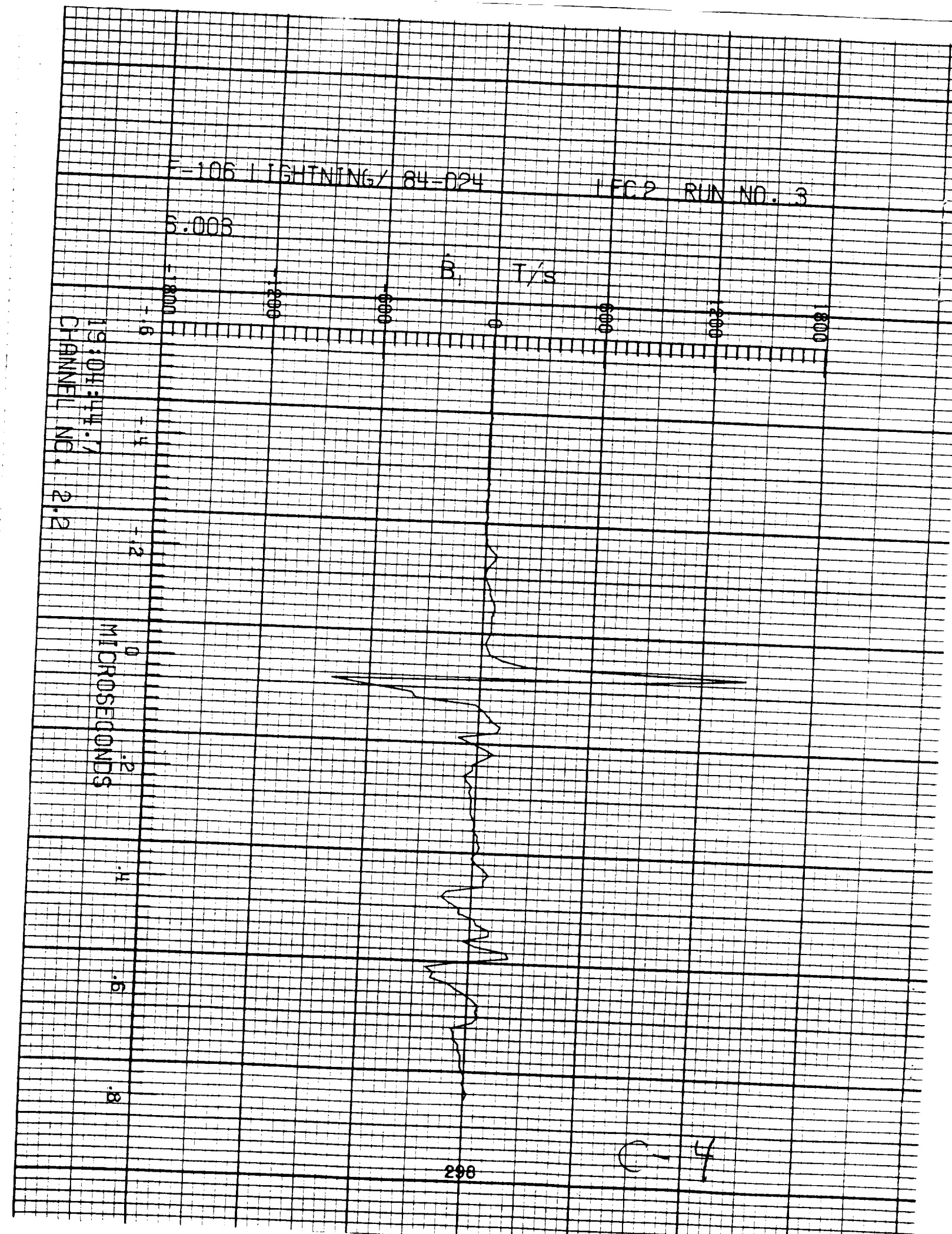
ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LEC 1 RUN NO. 3
6.003
$\dot{B}_{wr}$ T/s
-900
-600
-300
0
300
600
900
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
19:04:44.7
CHANNEL NO. 1.2

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LFC2 RUN NO. 3
6.008
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:04:44.7
CHANNEL NO. 2.2
C-4

F=106 LIGHTNING/ 84=024 IEC3 RUN NO. 3

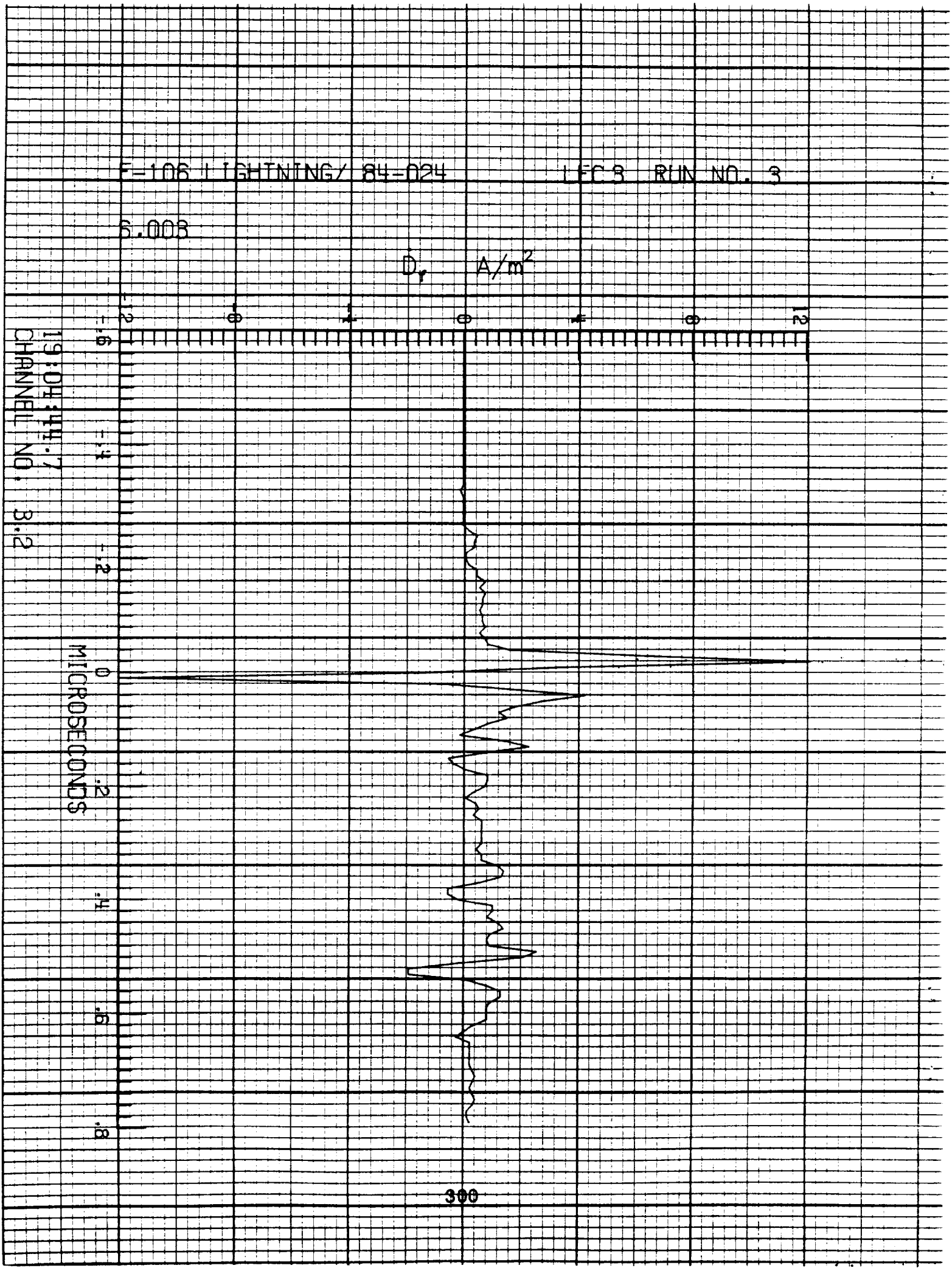
6.003

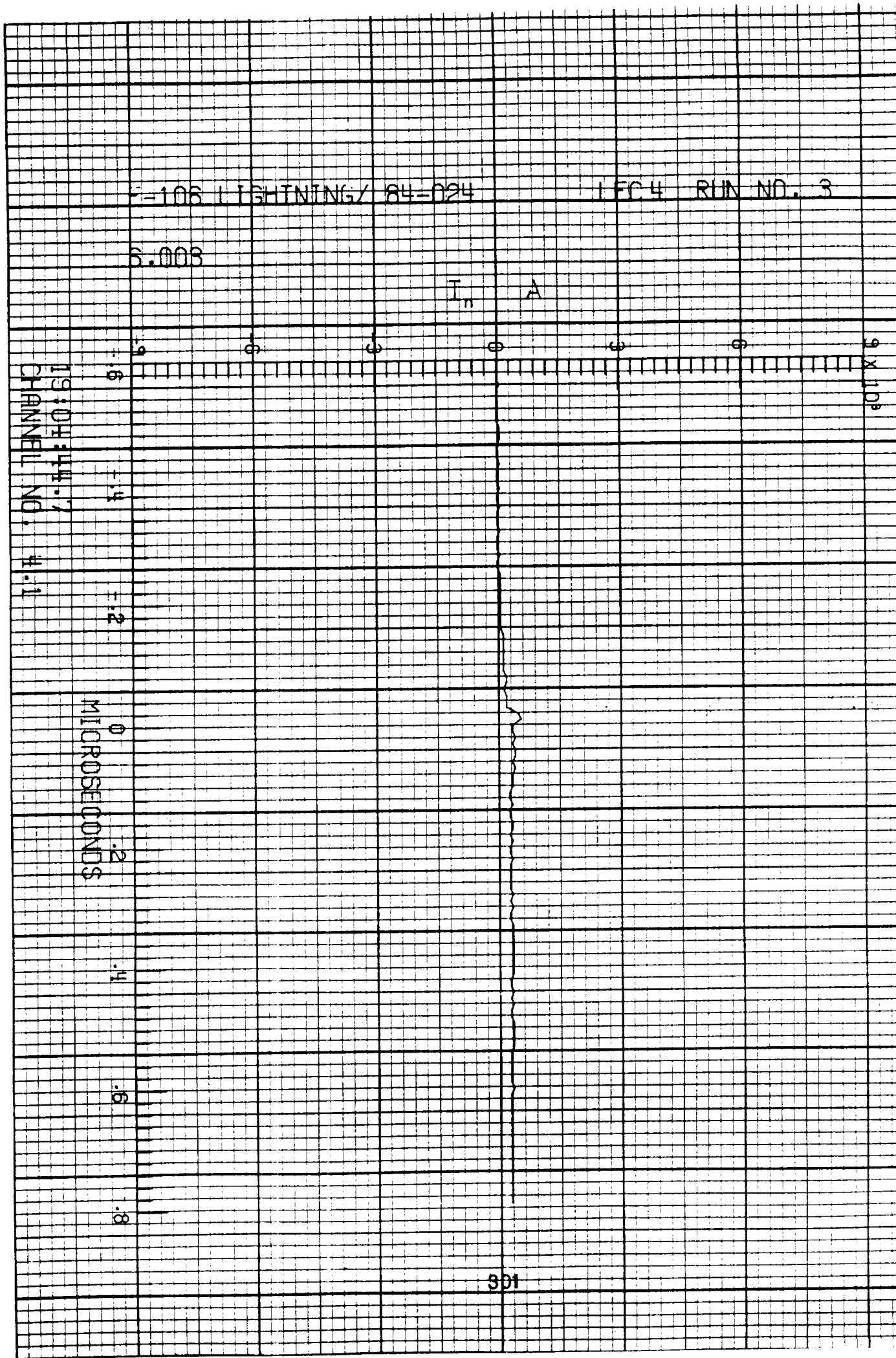
$\dot{D}_{w1}$ A/m^2

-1.8 -1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

CHANNEL NO: 8:11 15:04:44.7


F-106 LIGHTNING/ 84-024
LFC3 RUN NO. 3
6.003
D_r A/m^2
-12
-8
-4
0
4
8
12
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:04:44.7
CHANNEL NO. 3.2

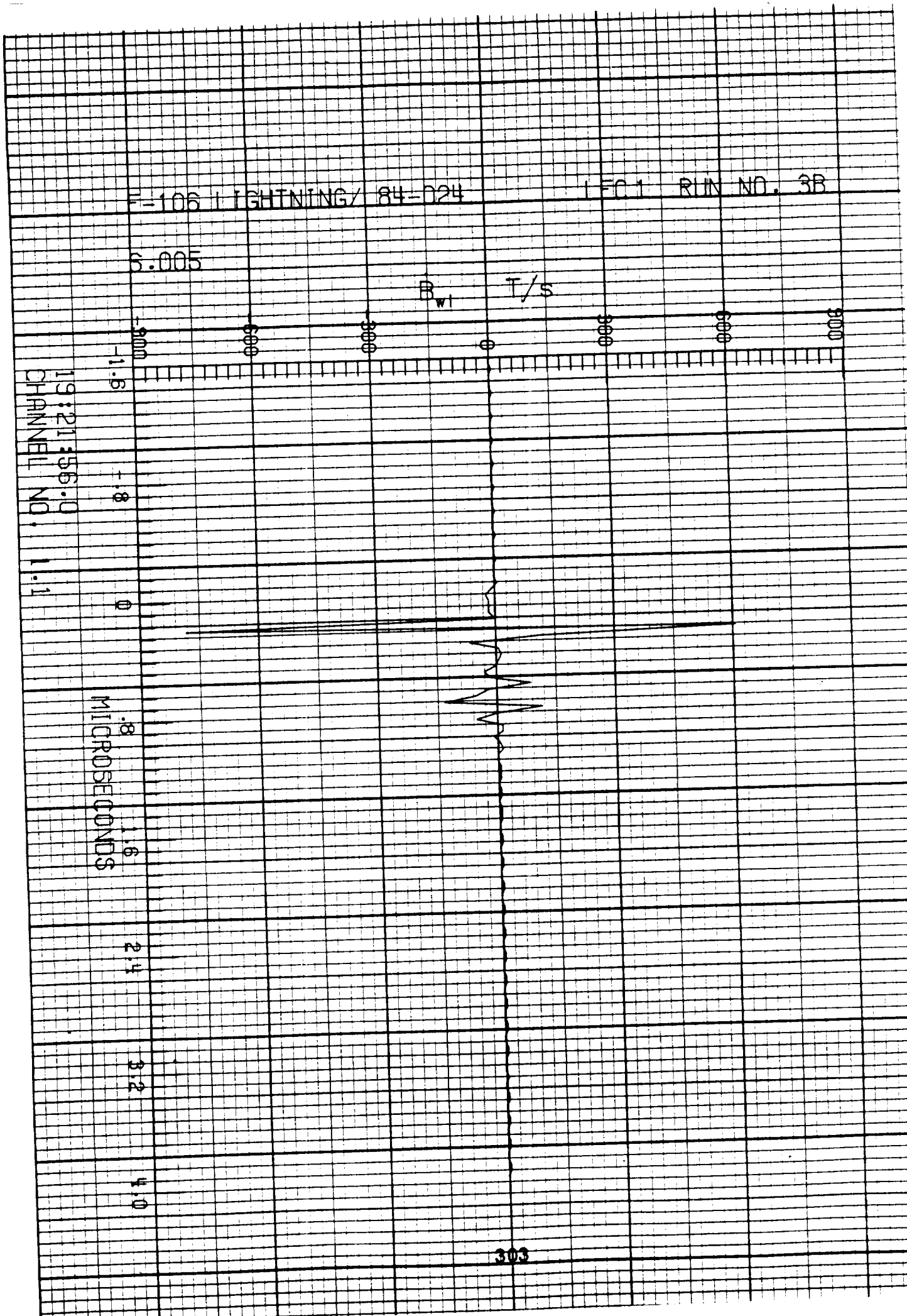

F-106 LIGHTNING/ 84-024
LFC4 RUN NO. 3
6.003
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:04:44.7
CHANNEL NO. 4.1

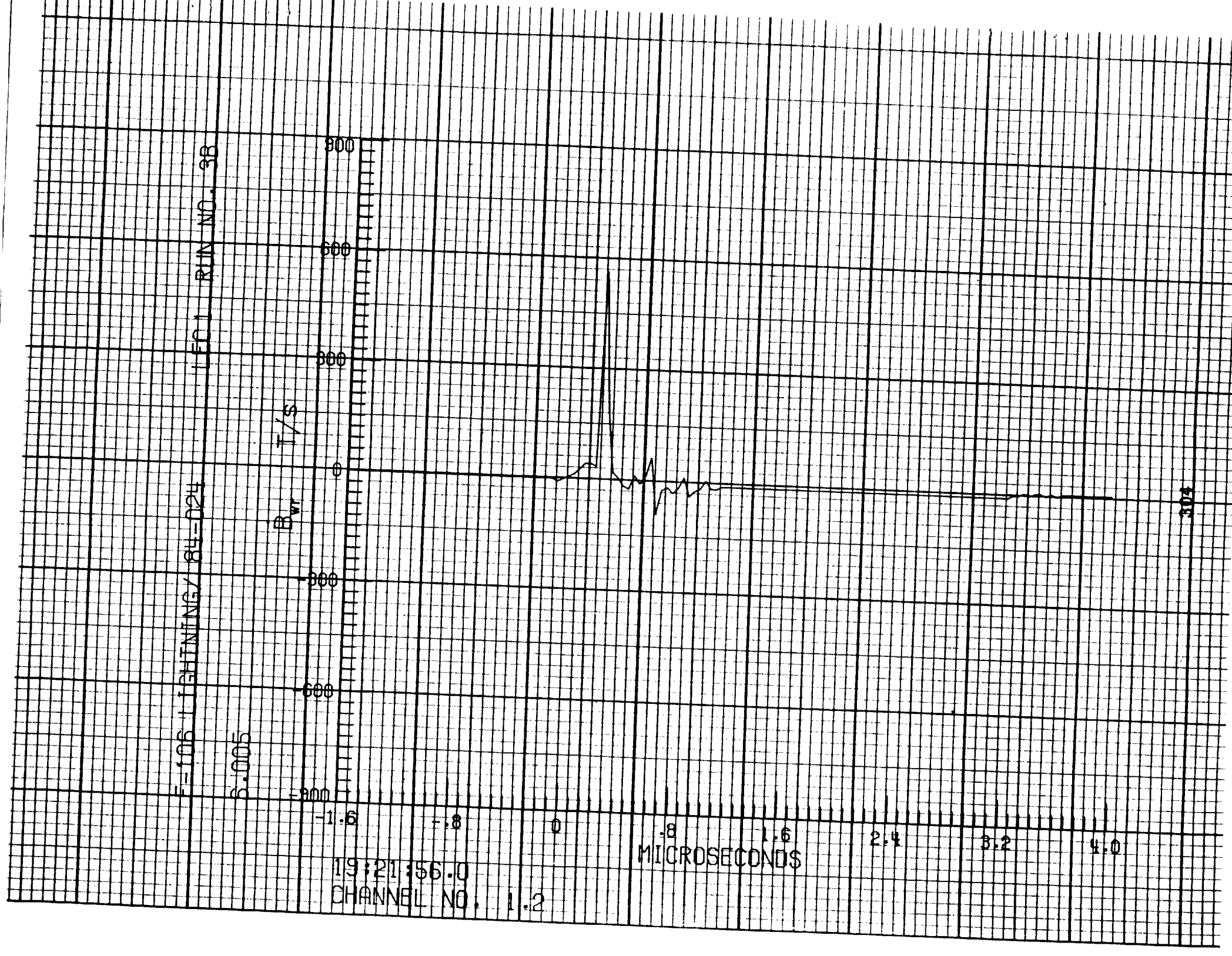
F-106 LIGHTNING/ 84-024 IFC 4 RUN NO. 3

6.003

T_t A

9.6 9.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8 6.0 6.2 6.4 6.6 6.8 7.0 7.2 7.4 7.6 7.8 8.0 8.2 8.4 8.6 8.8


F-106 LIGHTNING/ 84-024
LFC1 RUN NO. 3B
6.005
$\dot{B}_{w1}$ T/s
-900
-600
-300
0
300
600
900
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
19:21:56.0
CHANNEL NO. 1.1


900
600
300
0
-300
-600
-900
T/S
B_{wr}
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
304
F=106 LIGHTNING/ 84-024
6.005
19:21:56.0
CHANNEL NO. 1.2
FC 1 RUN NO. 38

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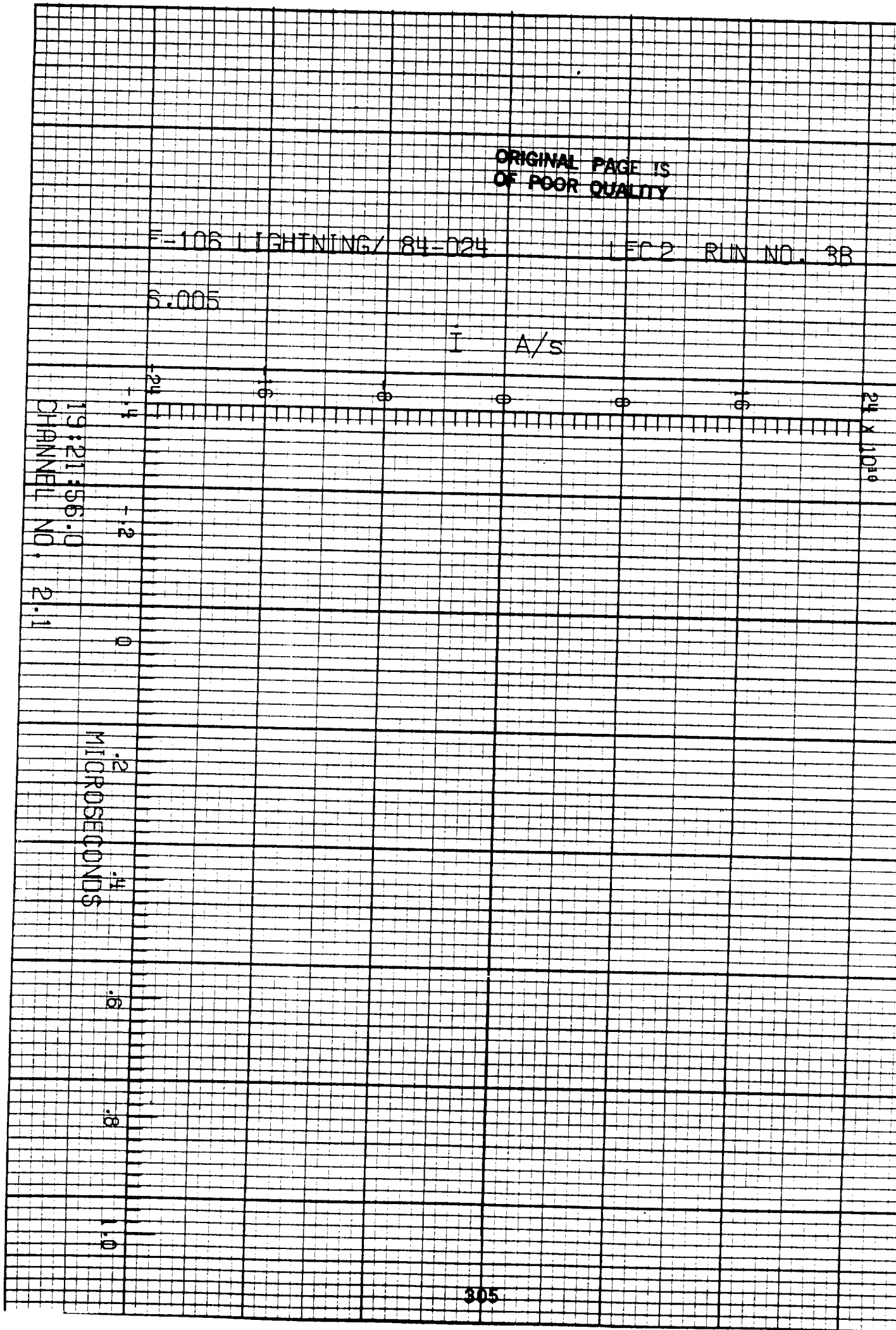
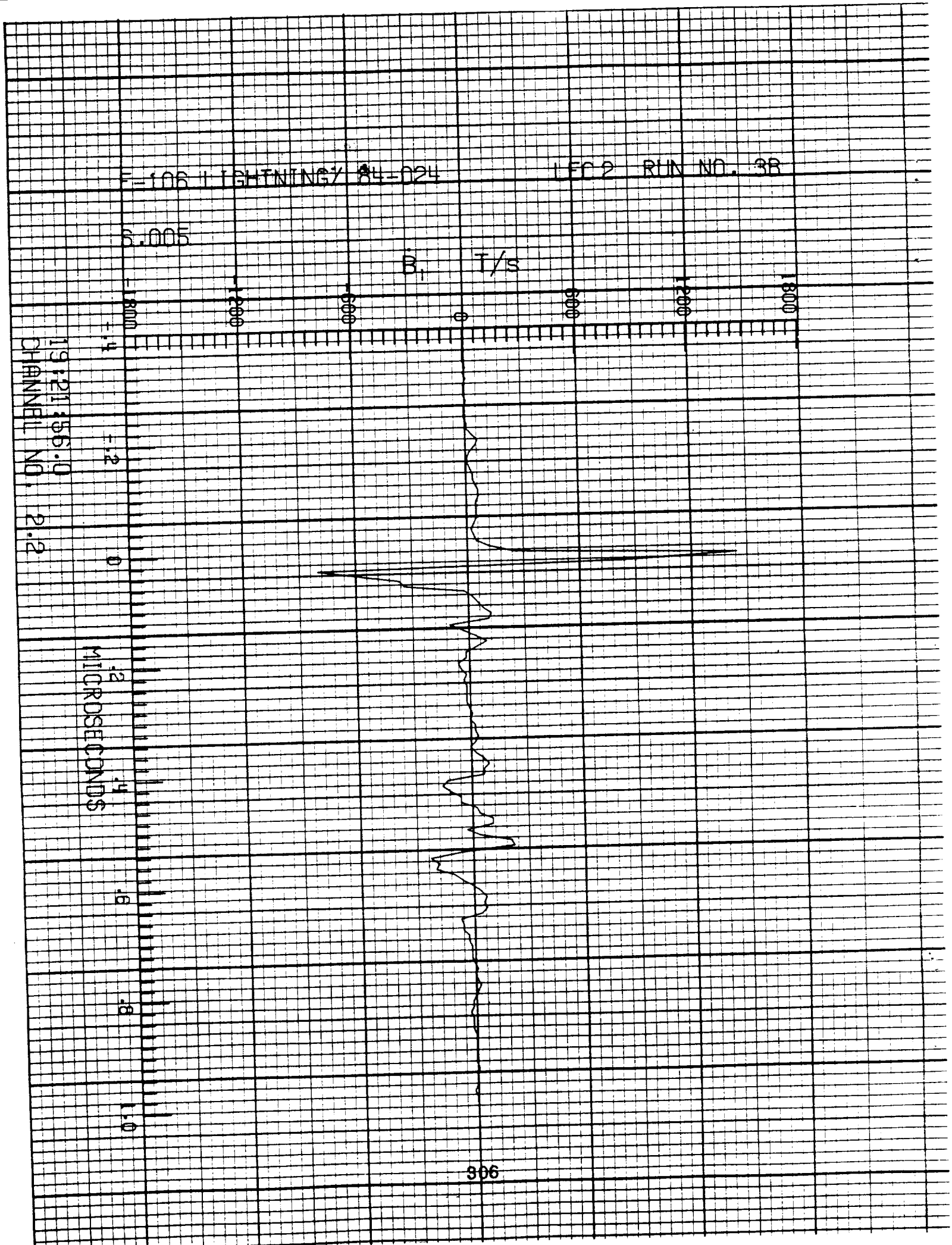
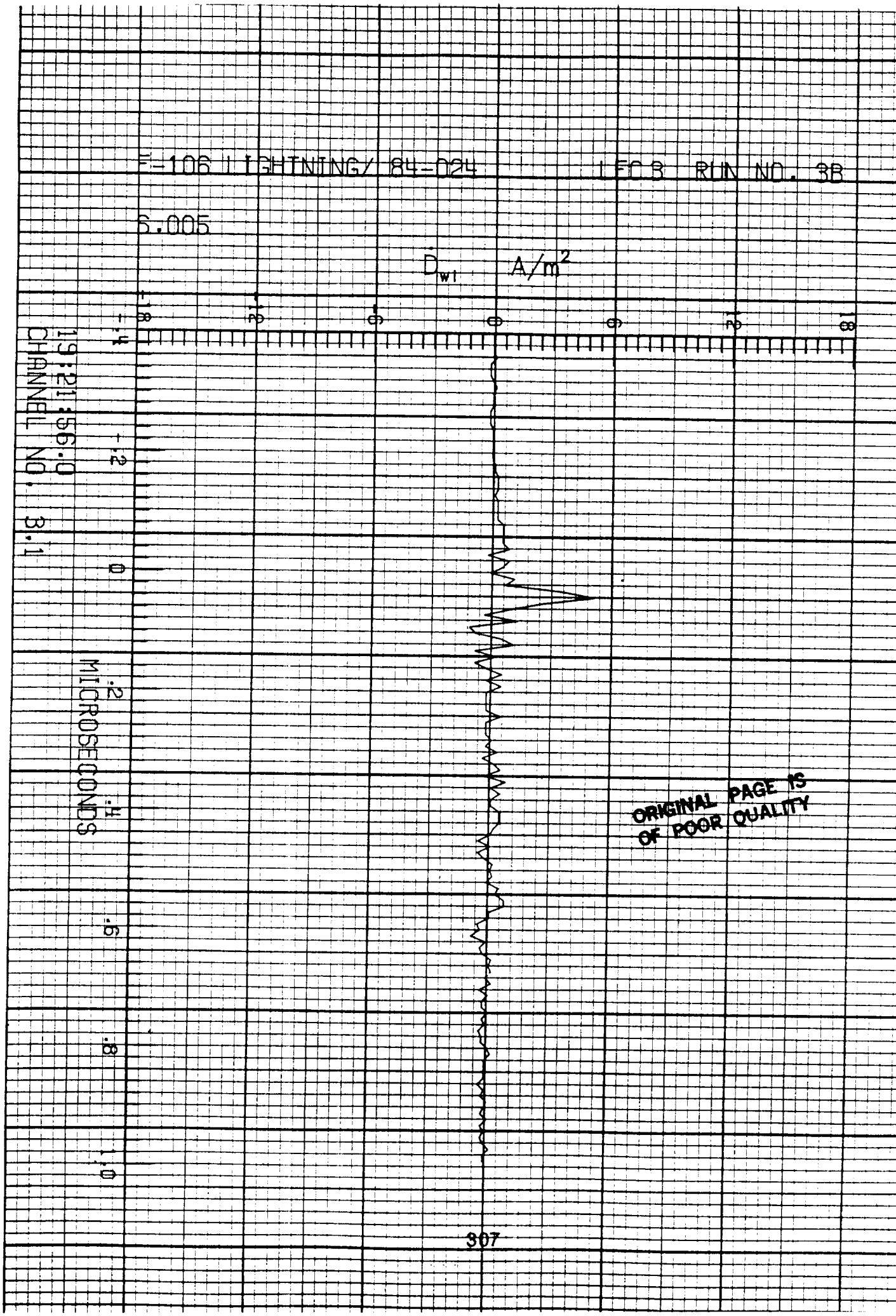



F-106 LIGHTNING/ 84-024
LFC 2 RUN NO. 3B
6.005
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:21:56.0
CHANNEL NO. 2.2



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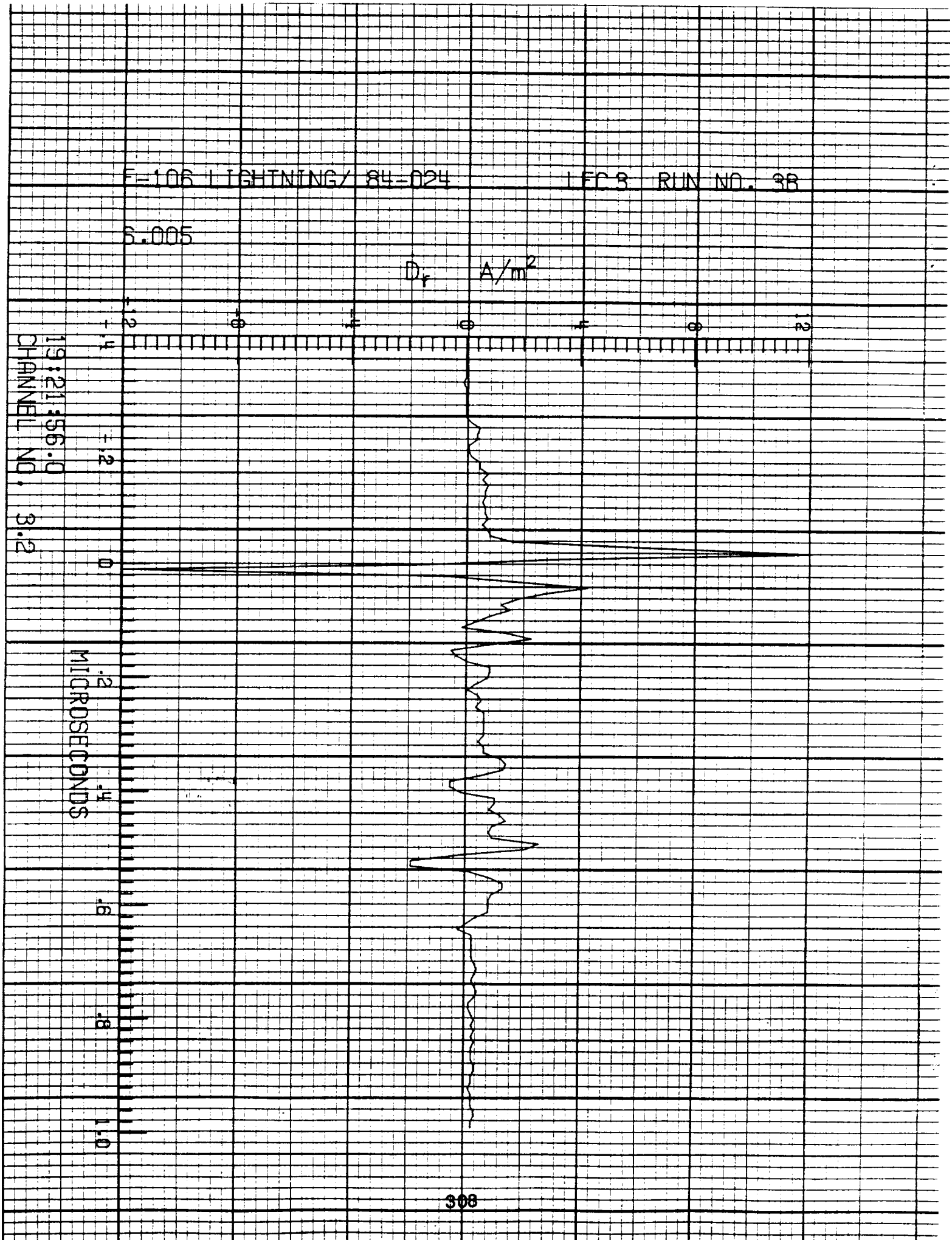
F-106 LIGHTNING/ 84-024
LEC 3 RUN NO. 3B
6.005
D_r A/m^2
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:21:56.0
CHANNEL NO. 3.2

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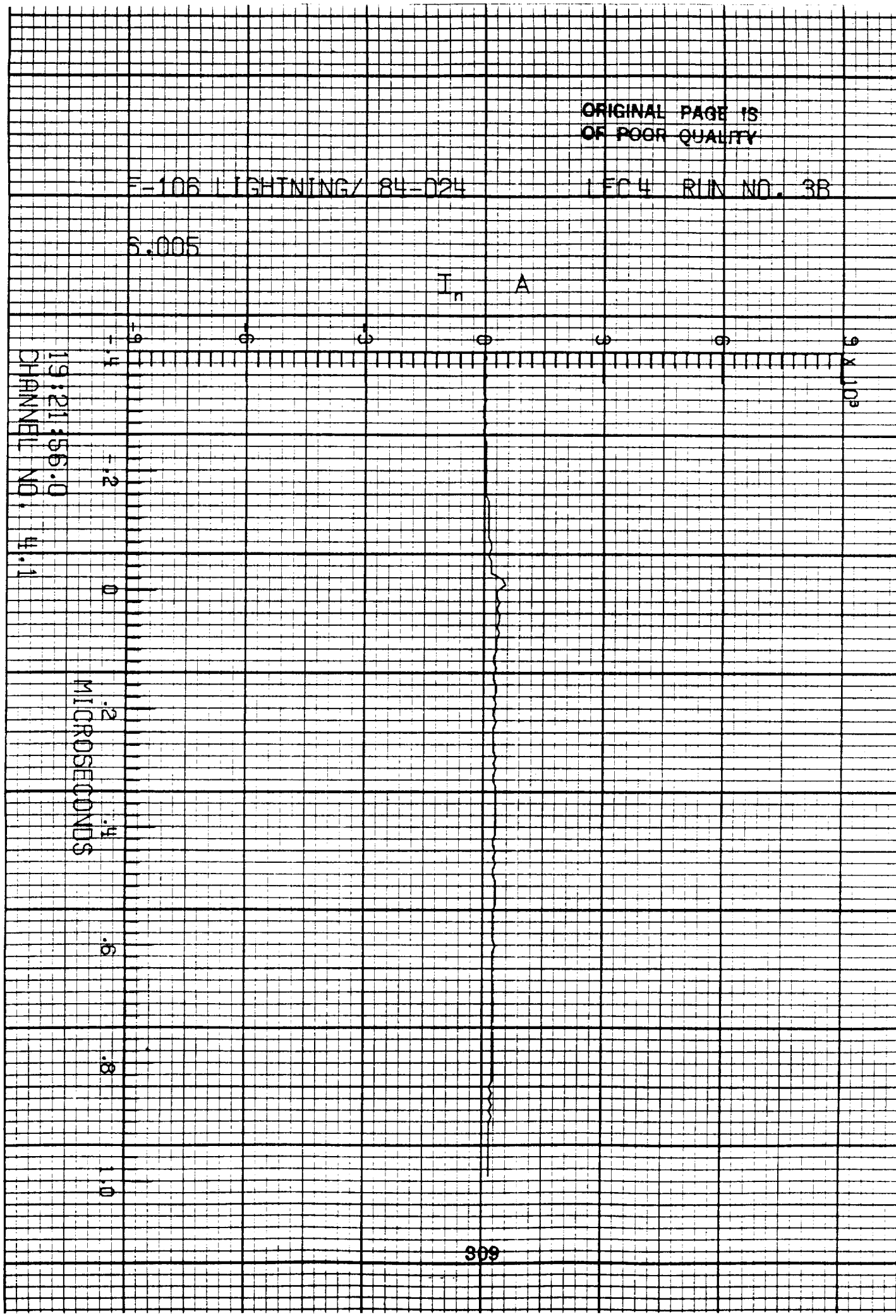

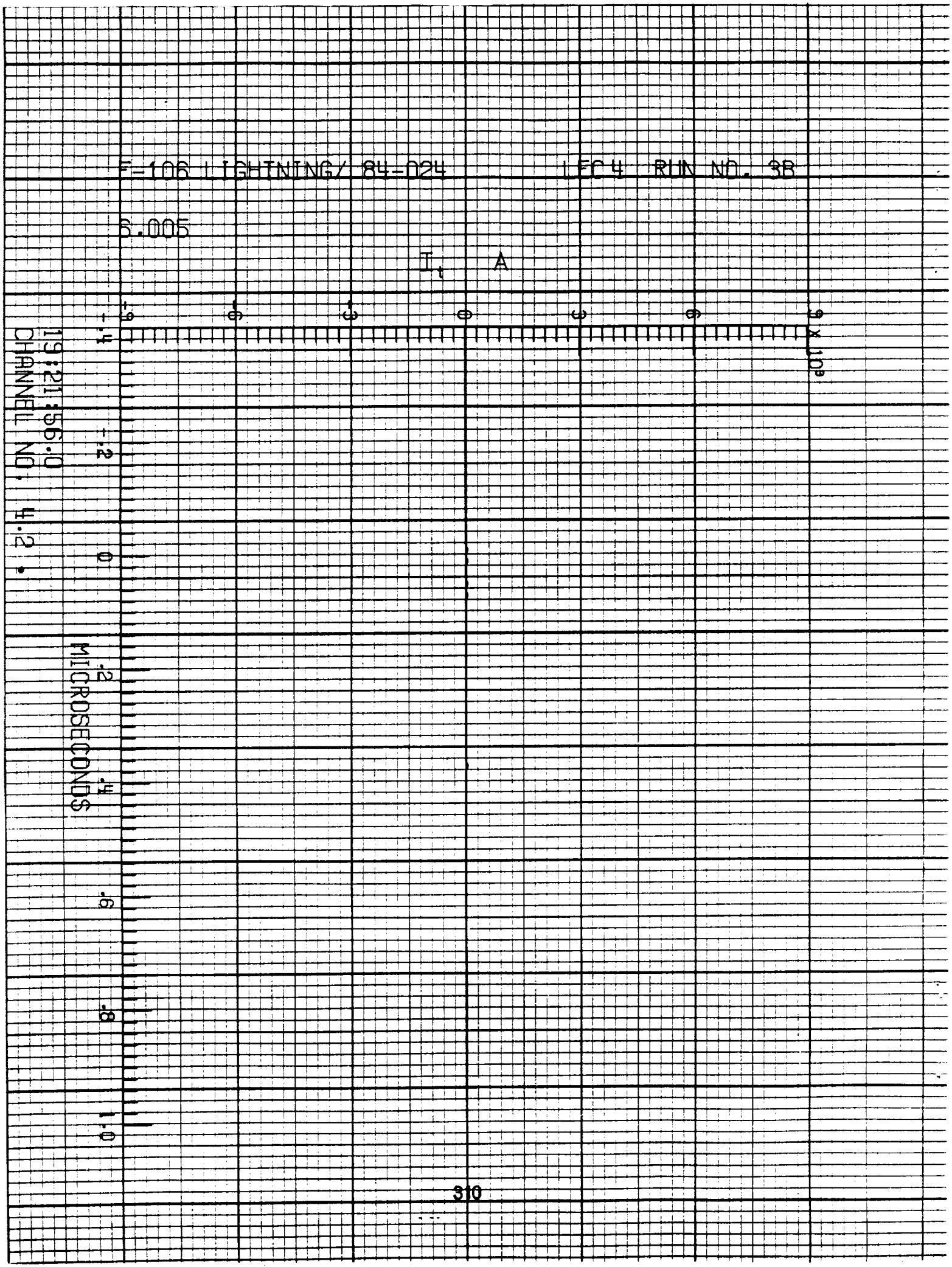
F-106 LIGHTNING/ 84-024
LFC4 RUN NO. 3B
6.005
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:21:56.0
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-024 LEC 1 RUN NO. 4

6.006

B_{wi} T/S

-900 -600 -300 0 300 600 900

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

19:22:57.5
CHANNEL NO. 1.1

F-106 LIGHTNING/ 84-024 IFC 1 RUN NO. 4

6.006

$\dot{B}_{wr}$ T/s

-.006 -.004 -.002 0 .002 .004 .006

CHANNEL NO. 1 19:22:57.5

-.8 0 .8

1:2

MICROSECONDS

1:6 2:4 3:2 4:0 4:8

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-024 LEC 2 RUN NO. 4

6.006

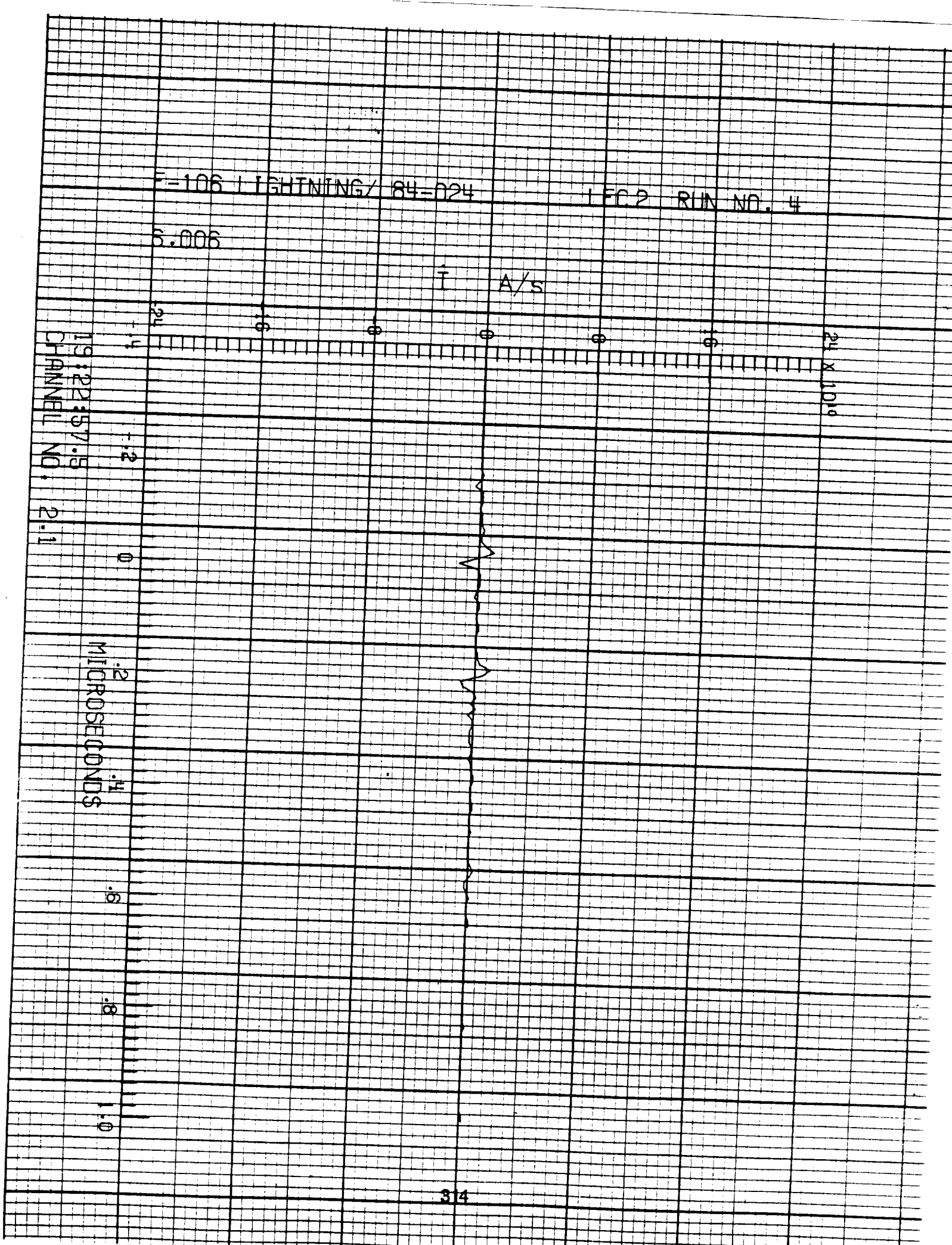
$\vec{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

16:22:57.5
CHANNEL NO. 2.0


F=106 LIGHTNING/ 84-024
LFC2 RUN NO. 4
6.006
Î A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:22:57.5
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-024 LEC 2 RUN NO. 4

6.006

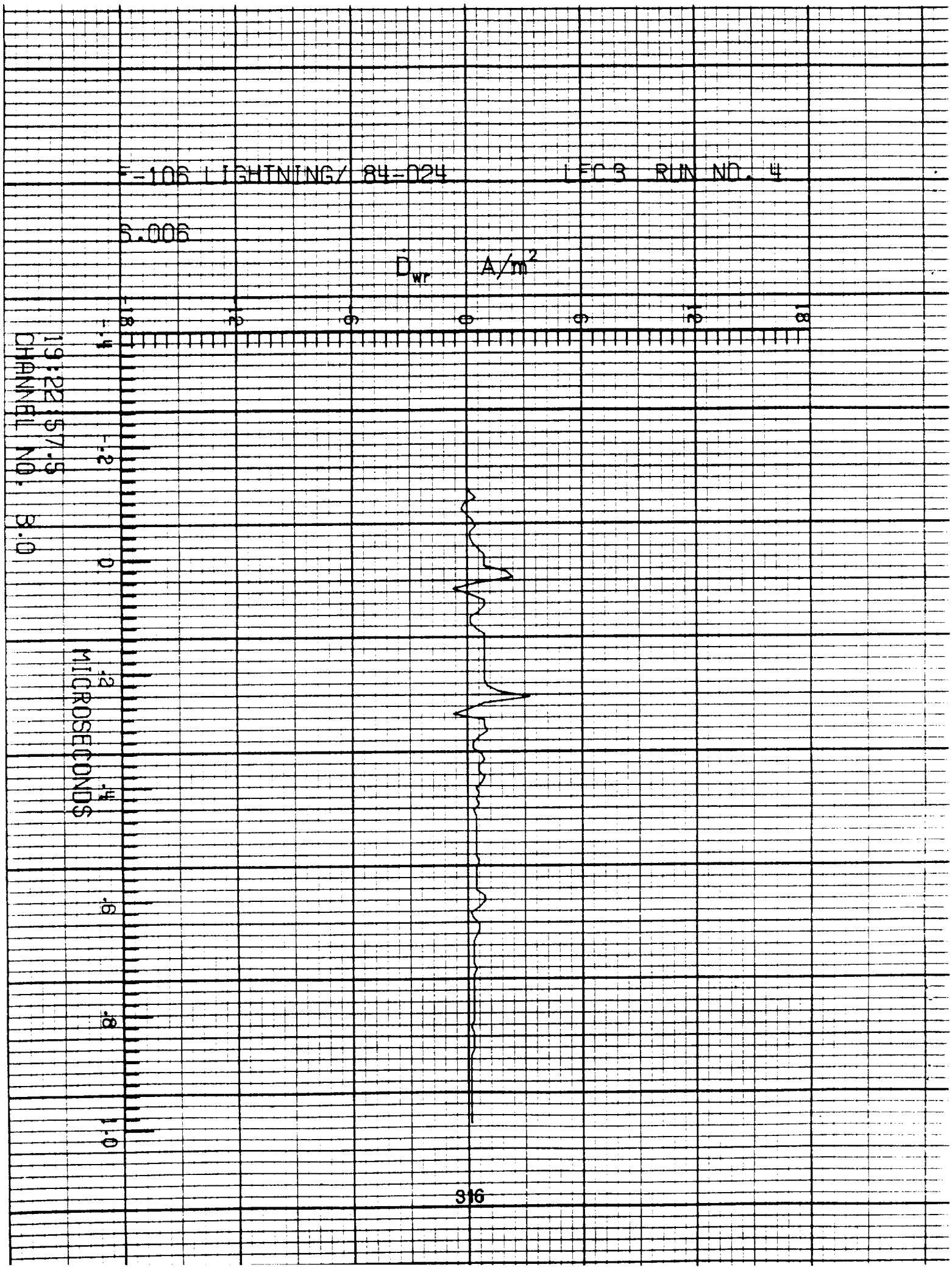
$\dot{B}_1$ T/S

-1800 -1200 -800 0 800 1200 1800

+.4
+.2
0
-.2
-.4
-.6
-.8
-1.0

MICROSECONDS

11:22:57.5
CHANNEL NO. 2.2


F-106 LIGHTNING/ 84-024
LEC 3 RUN NO. 4
6.006
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:22:57.5
CHANNEL NO. 3.0

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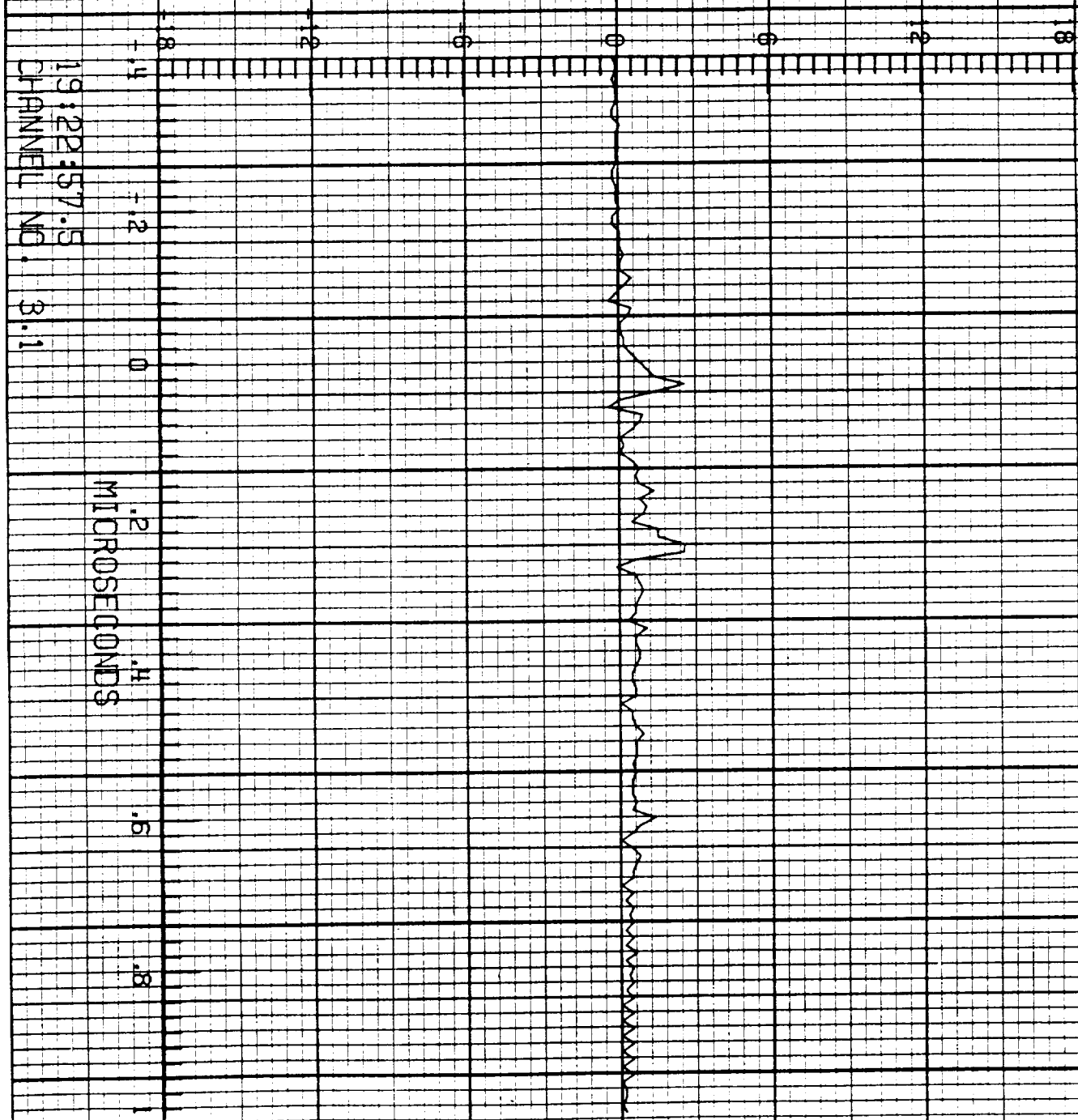
F-106 LIGHTNING/ 84-024 LFC 3 RUN NO. 4

6.006

D_{wt} A/m^2



F-106 LIGHTNING/ 84-024 IFC 3 RUN NO. 4

6.006

D_f A/m^2

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

19:22:57.6 CHANNEL NO. B.2

ORIGINAL PAGE IS
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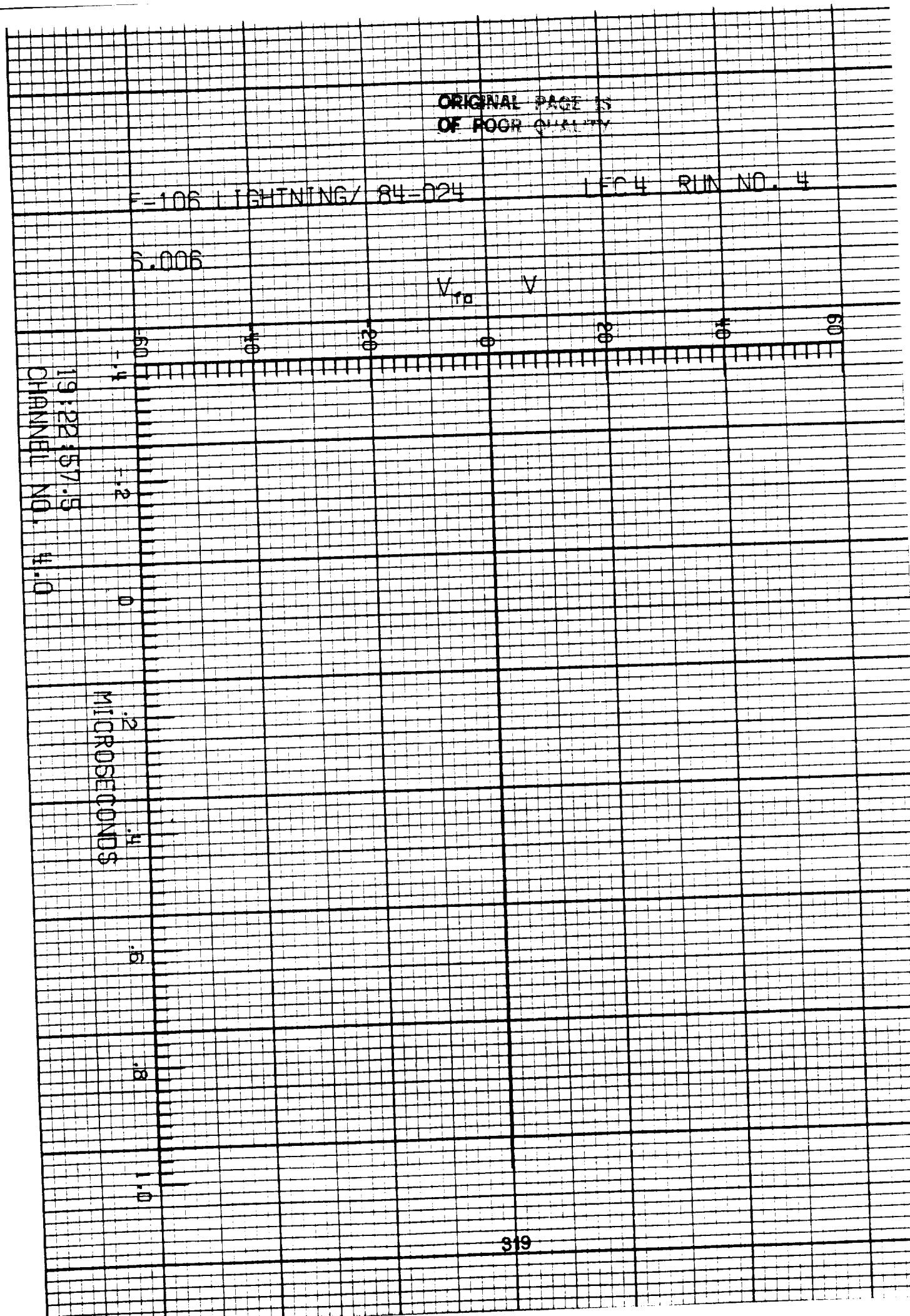

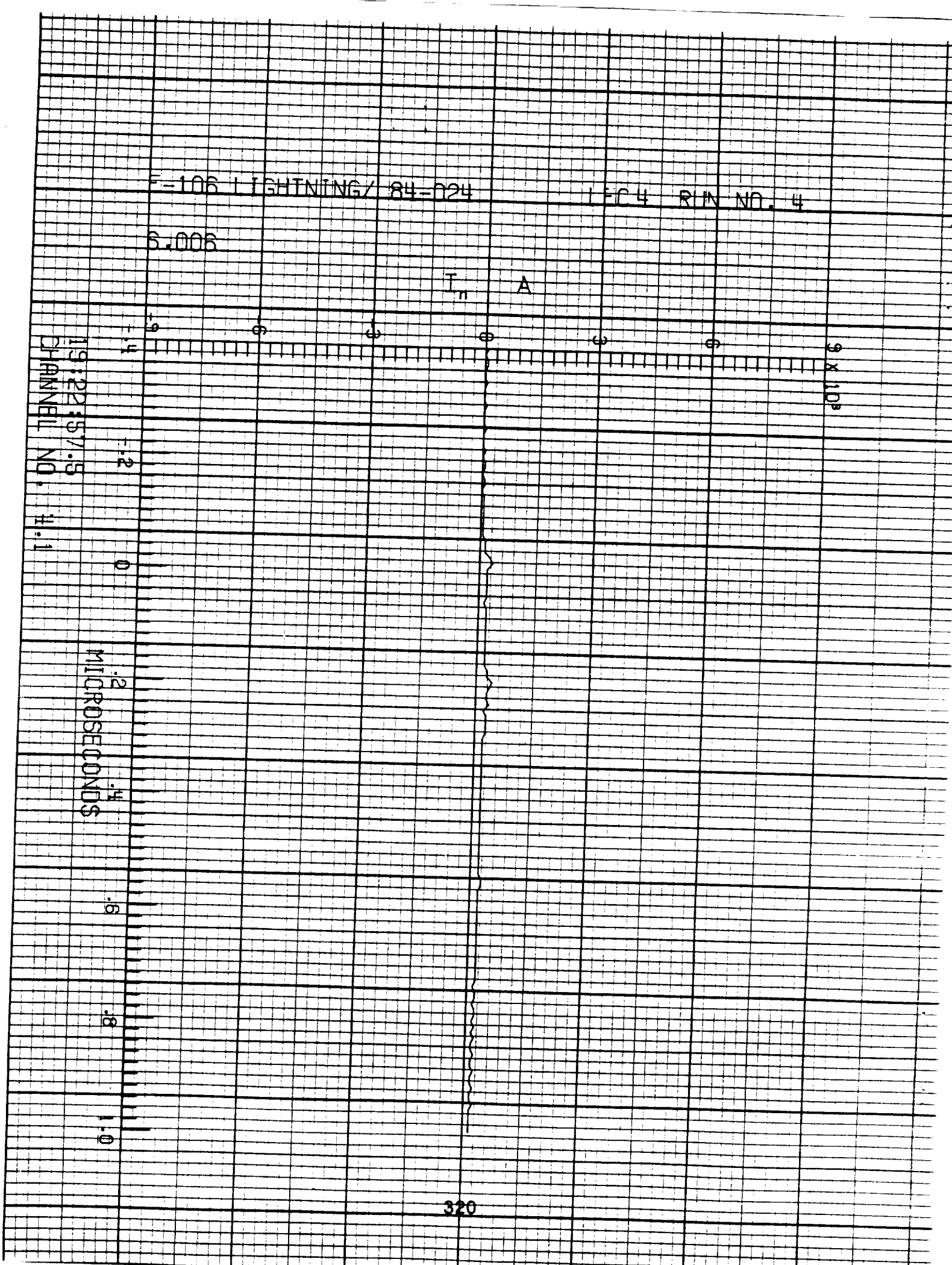
F-106 LIGHTNING/ 84-024
LEC4 RUN NO. 4
6.006
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:22:57.5
CHANNEL NO. 4.1

ORIGINAL PAGE IS
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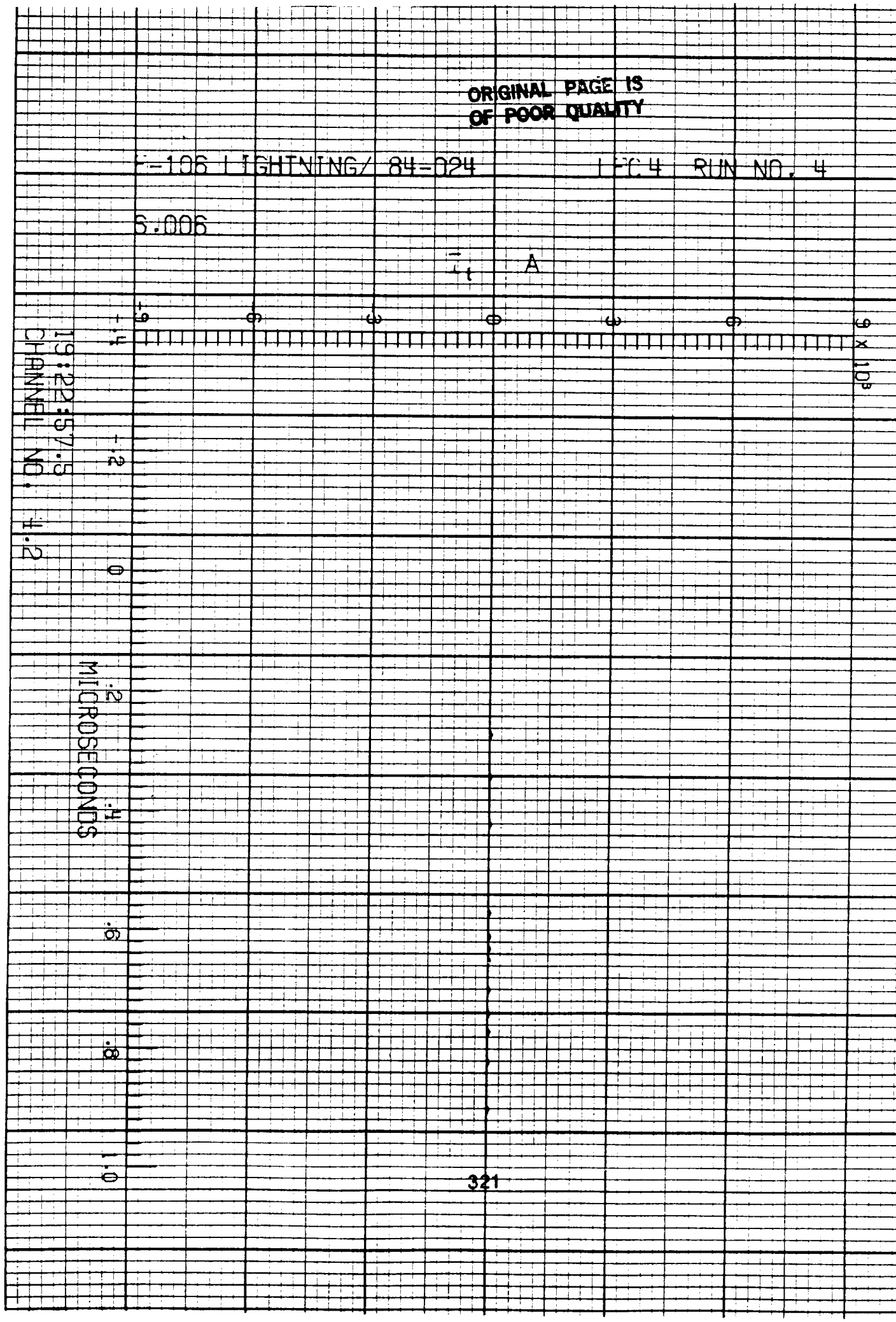
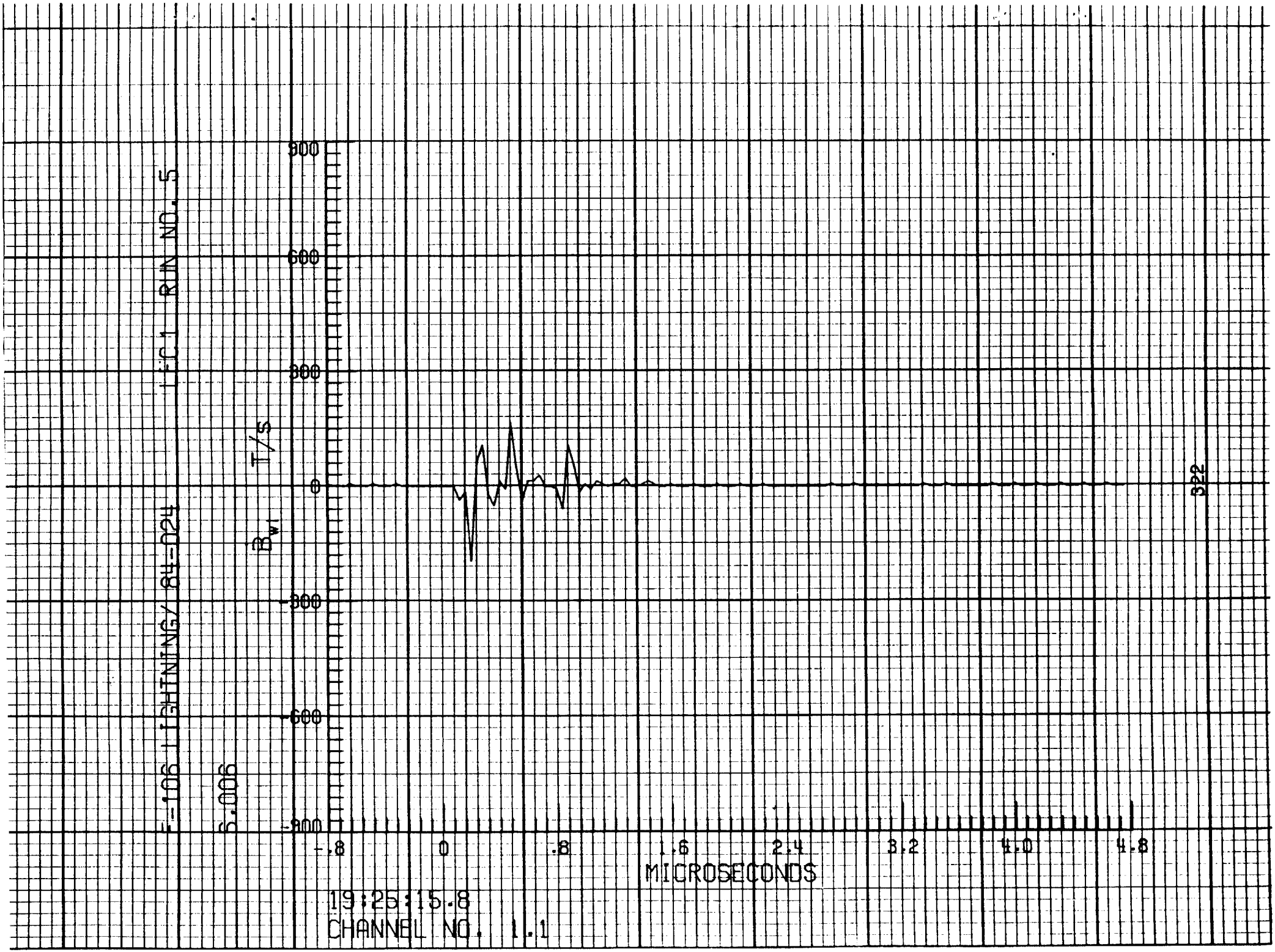
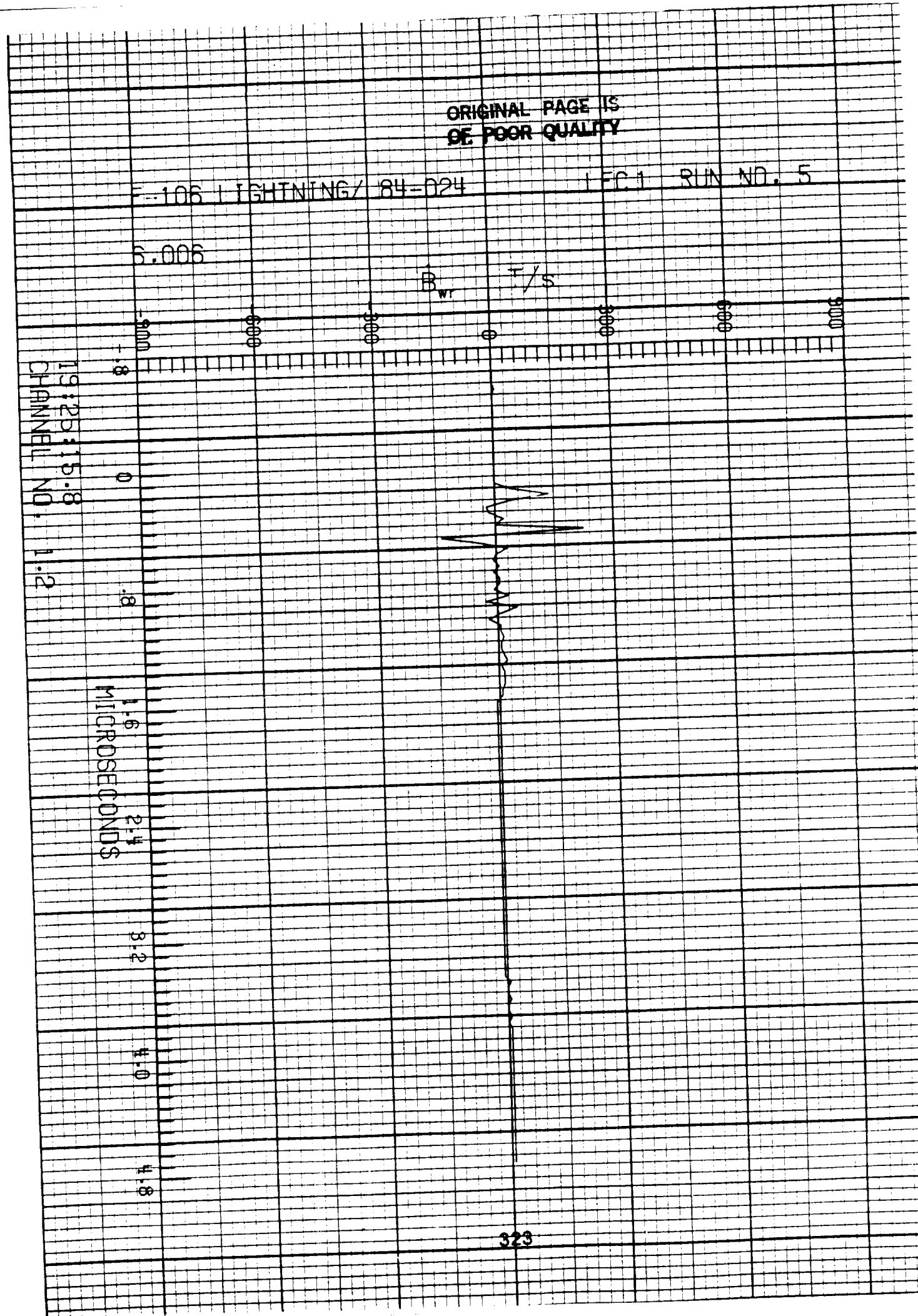



900
600
300
0
-300
-600
-900
T/S
B_{ϕ}
322
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
F=106 LIGHTNING/ 84-024 FIG.1 RUN NO. 5
6.006
19:25:15.8
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-024 LEC 2 RUN NO. 5

6.006

D_t A/m²

-3 -2 -1 0 1 2 3

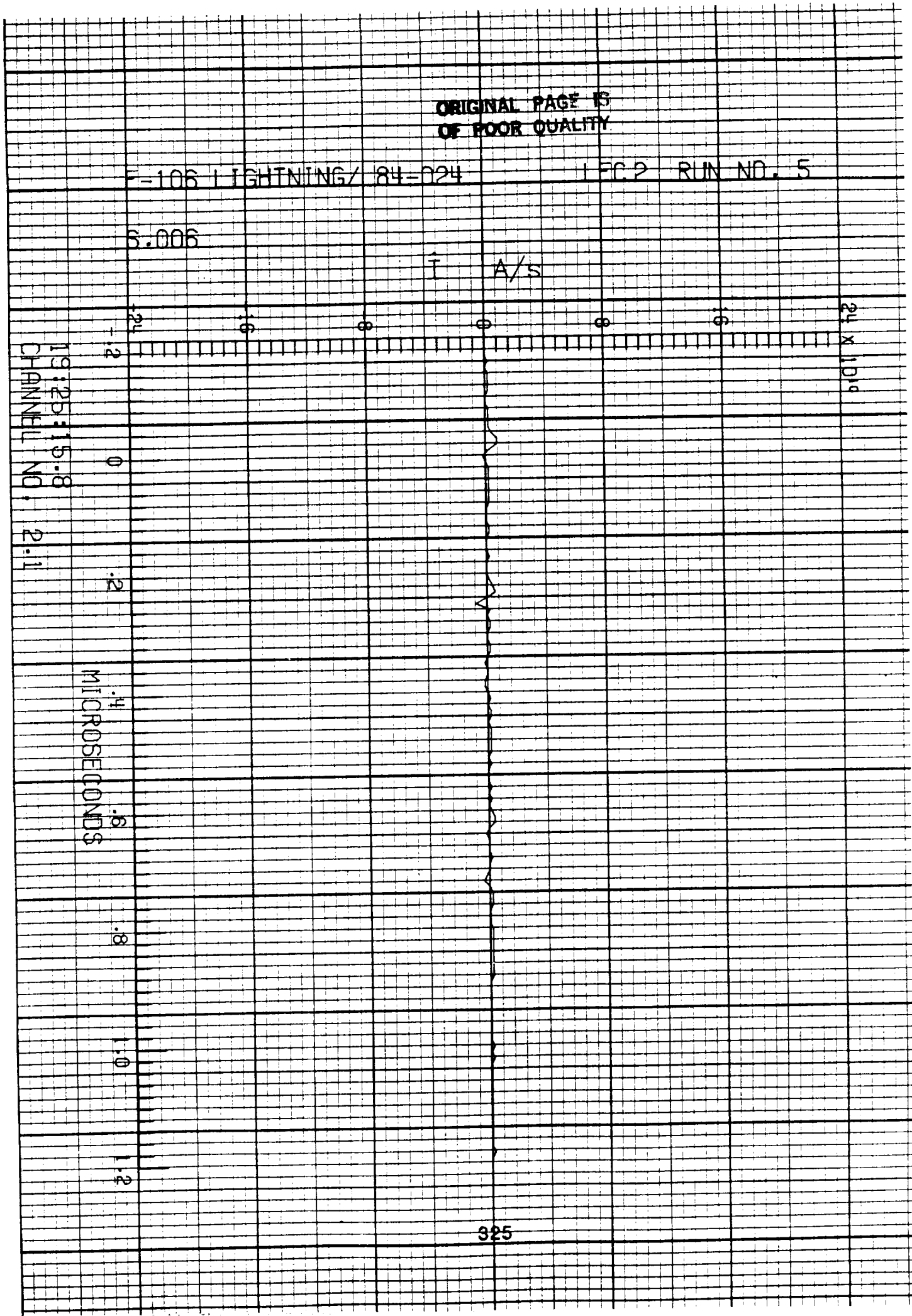
-.2 0 .2 .4 .6 .8 1.0 1.2

MICROSECONDS

19:25:15.8

CHANNEL NO. 2.0

ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-024 IFC 2 RUN NO. 5

6.006

$\dot{B}_{11}$ T/S

-1800 -1200 -600 0 600 1200 1800

-1.2 0 .2 .4 .6 .8 1.0 1.2

MICROSECONDS

CHANNEL NO. 2: 19:25:15.8 2.2

ORIGINAL PAGE IS
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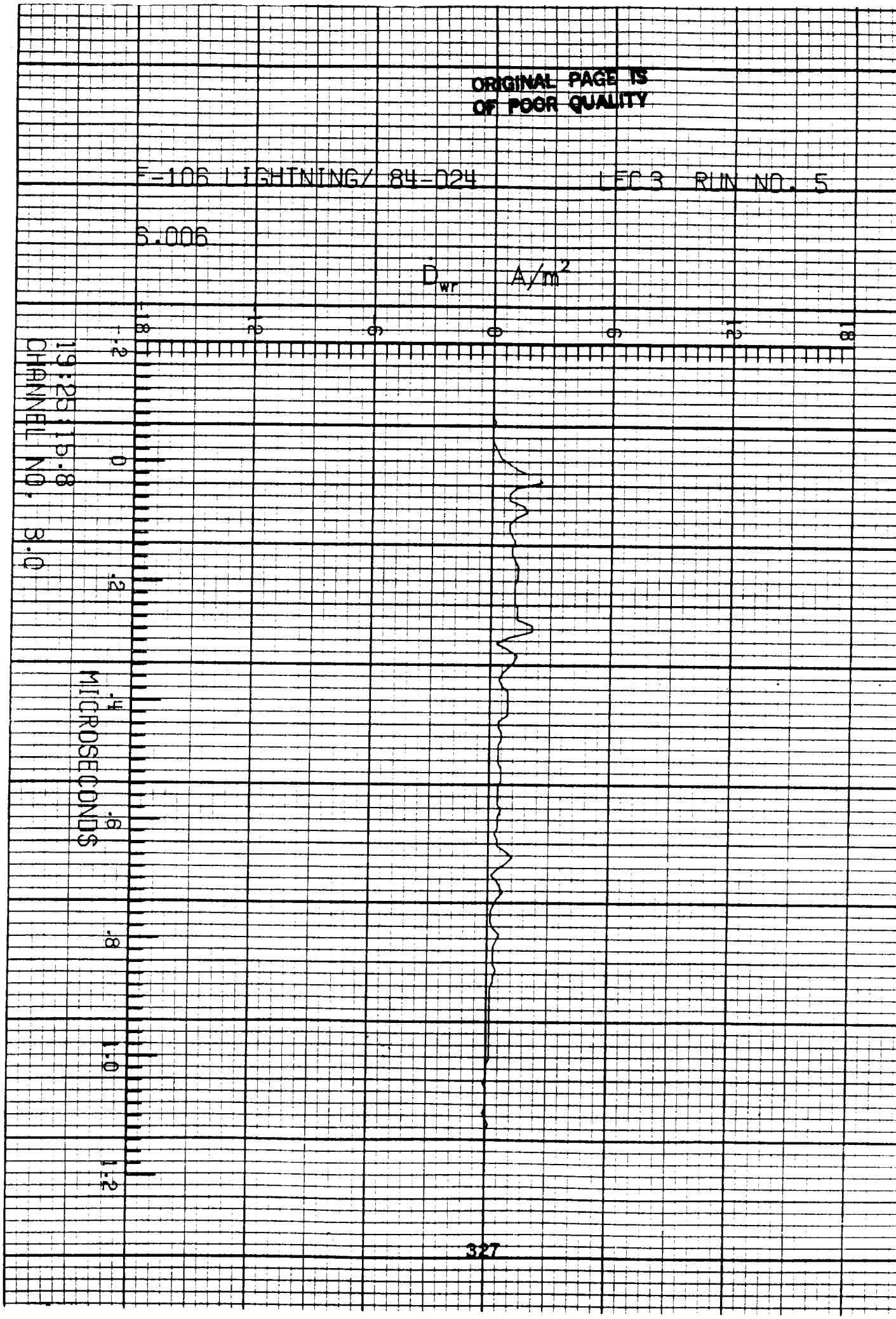
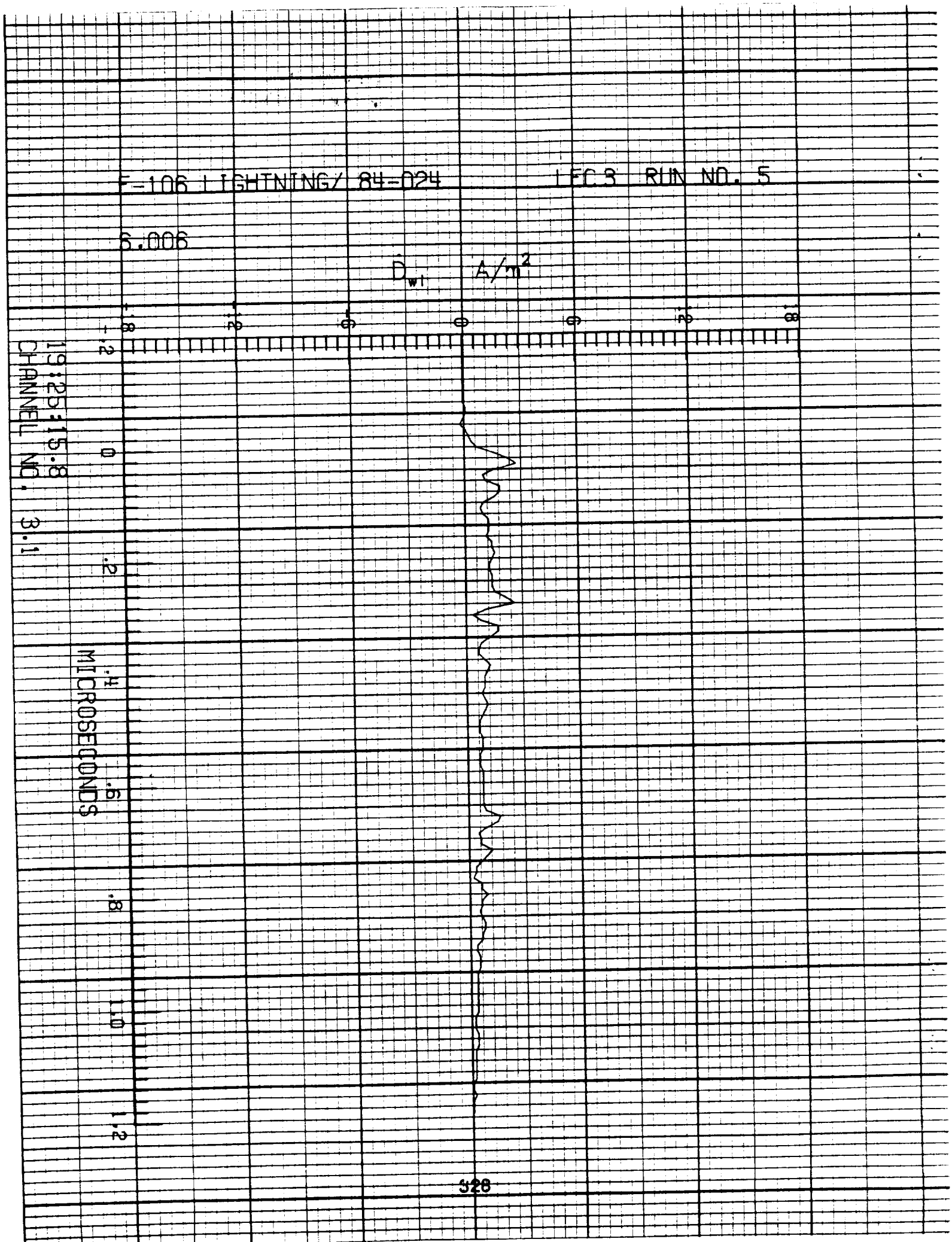


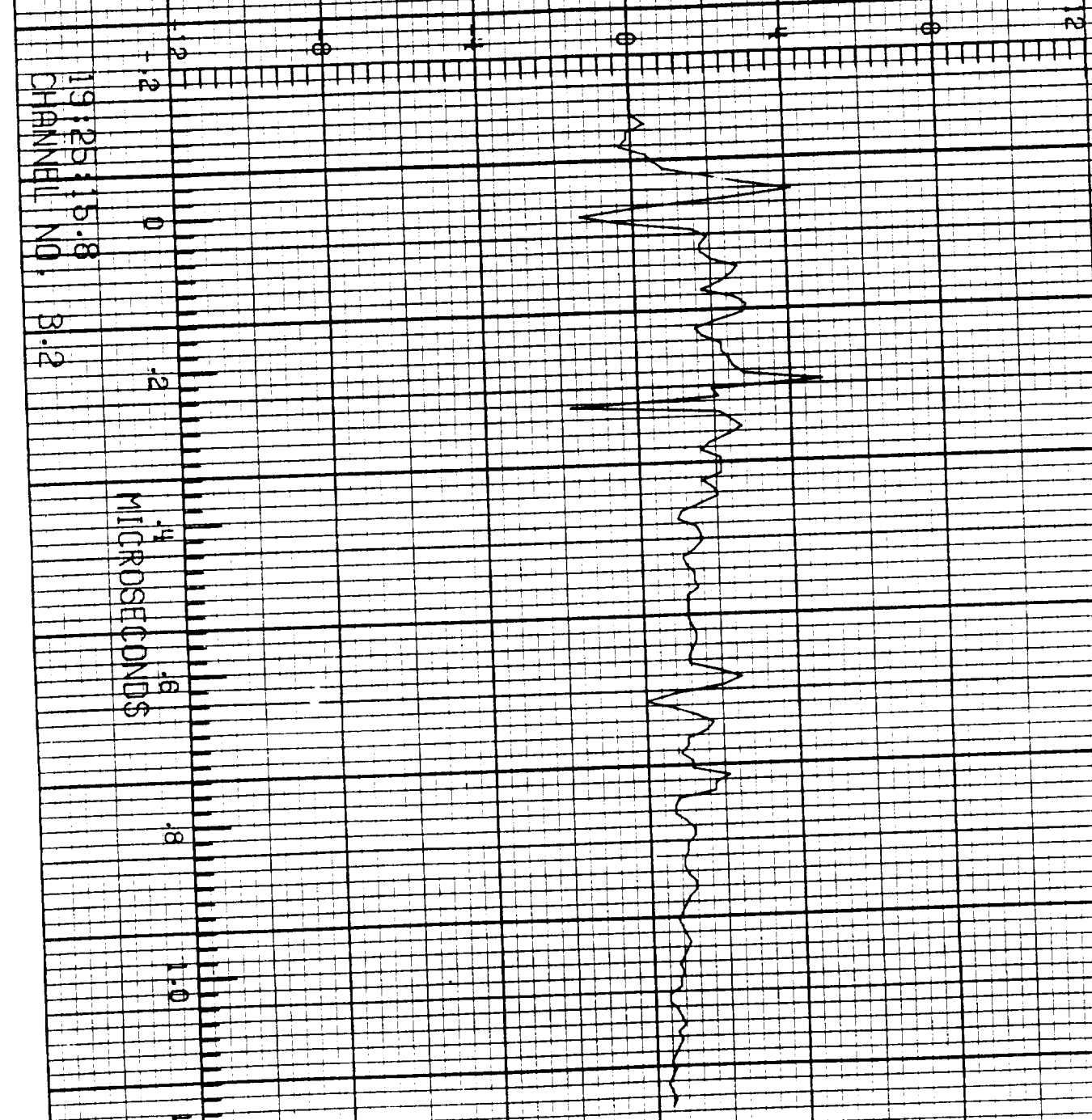

F-106 LIGHTNING/ 84-024
FC.3 RUN NO. 5
6.006
D_{wt} A/m^2
-.8
-.6
-.4
-.2
0
.2
.4
.6
.8
1.0
1.2
16:25:15.8
CHANNEL NO. 3.1
MICROSECONDS

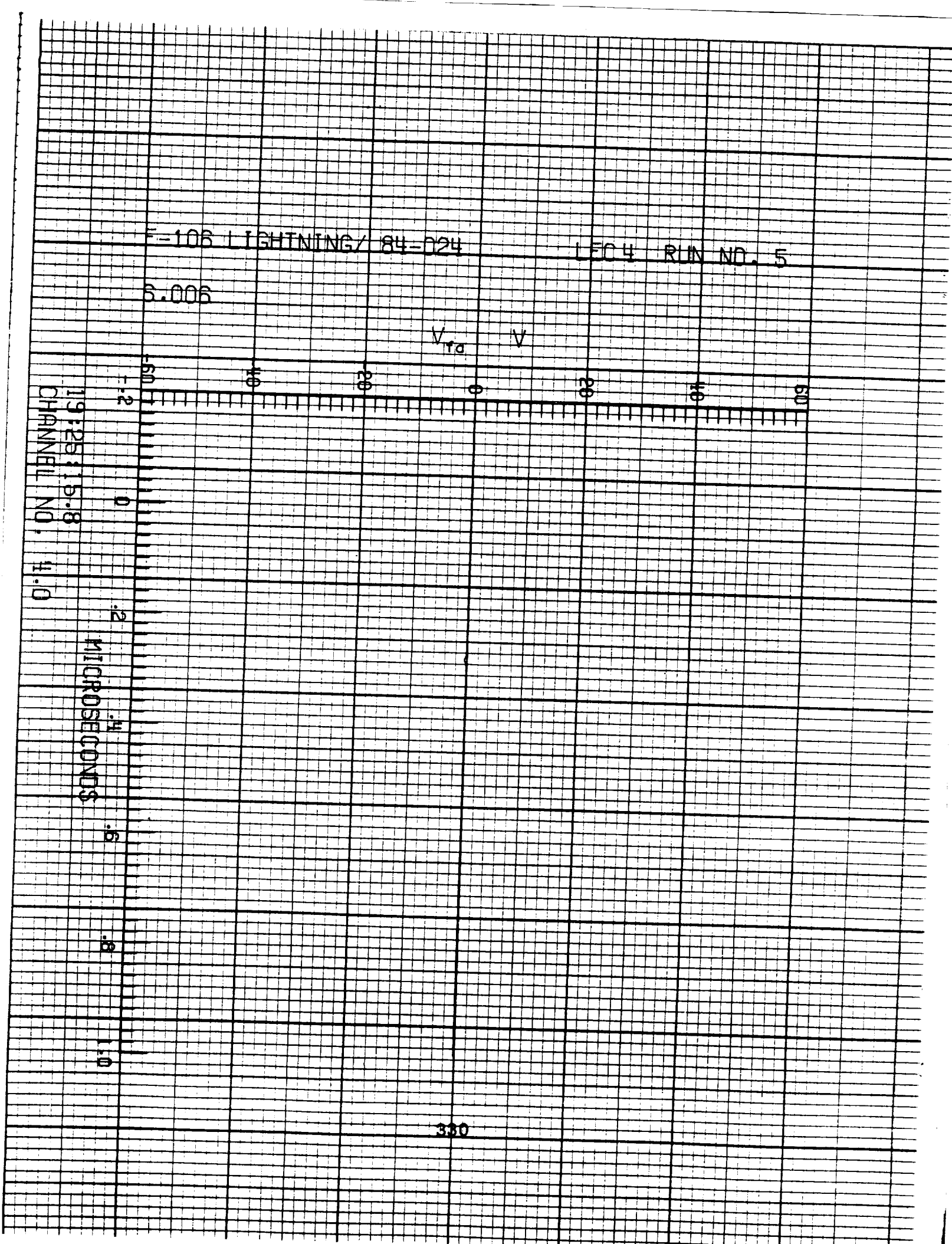
ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-024 FCS RUN NO. 5

6.006

$\dot{D}_f$ A/m^2




F-106 LIGHTNING/ 84-024
LEC4 RUN NO. 5
6.006
V_{fa} V
-60
-40
-20
0
20
40
60
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:25:15.8
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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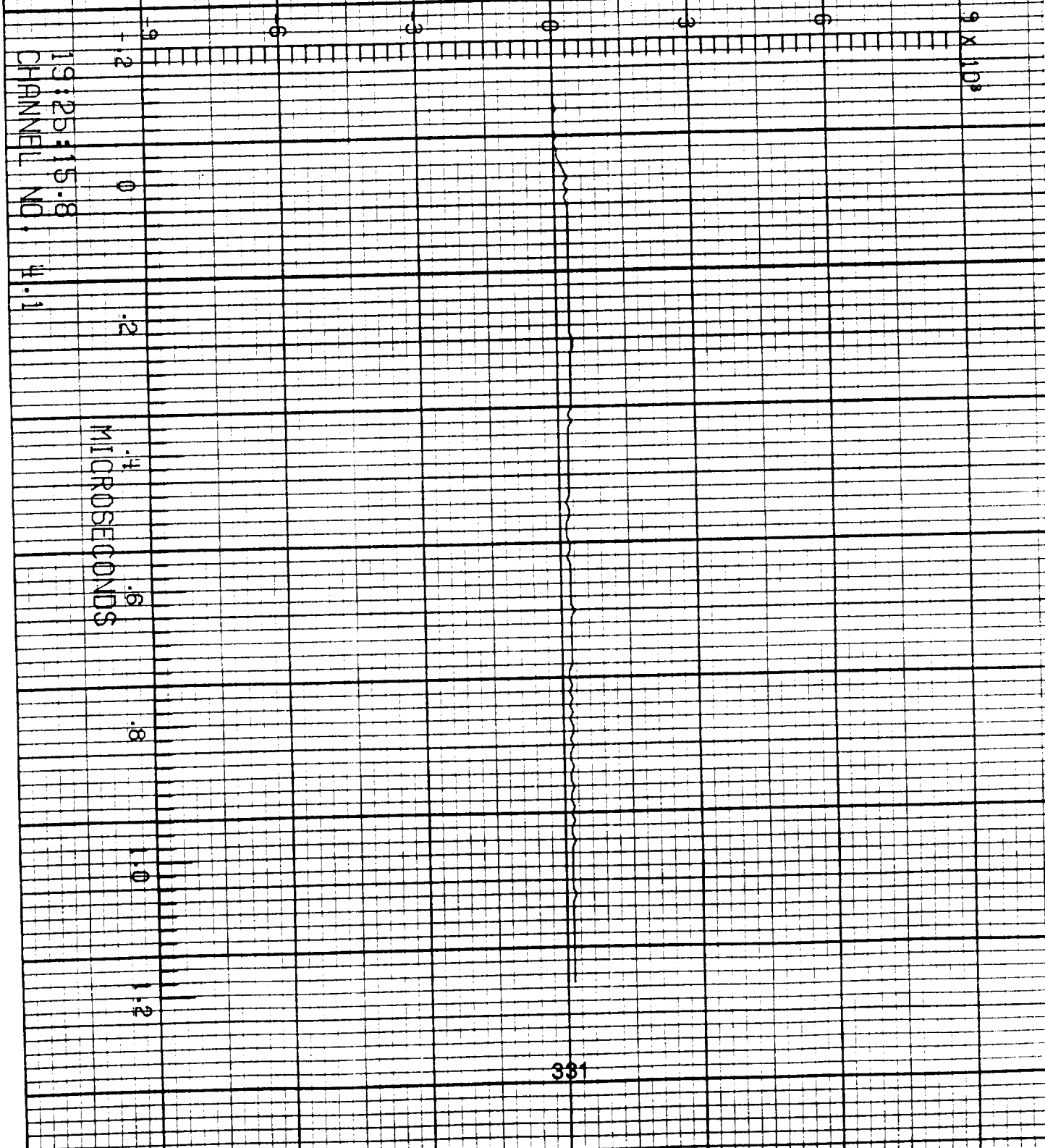
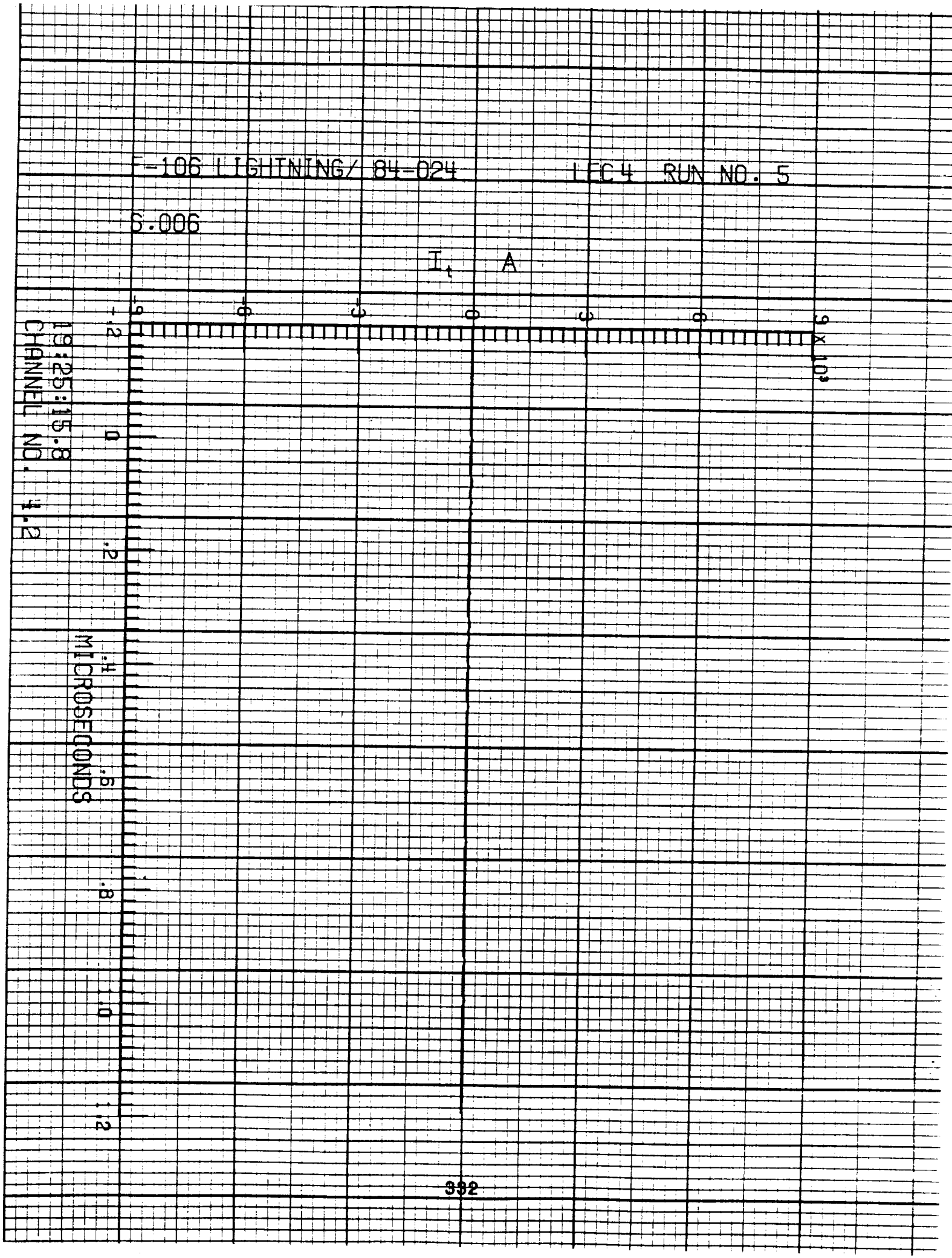
F=106 LIGHTNING/ 84-024 IFC4 RUN NO. 5

5.006

I_n A




F-106 LIGHTNING/ 84-024
LEC4 RUN NO. 5
S.006
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:25:15.8
CHANNEL NO. 4.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-024 IFC 1 RUN NO. 6

N.002

B_{dt} T/S

-800 -400 -200 0 200 400 800

-3.2 -2.4 -1.6 -.8 0 .8 1.6 2.4

MICROSECONDS

19:45:06:1
CHANNEL NO. 1.1

F-106 LIGHTNING/ 84-024 LEC 1 RUN NO. 6

N.002

$\dot{B}_{wr}$ T/$

-800 -600 -400 -200 0 200 400 600 800

-3.2 -2.4 -1.6 -.8 0 .8 1.6 2.4 3.2

MICROSECONDS

CHANNEL NO. 1 19:45:06.1 12.1

F-106 LIGHTNING/ 84-024 IFC 2 RUN NO. 6

N.002

D_t A/m^2

-3 -2 -1 0 1 2 3

-.2 0 .2 .4 .6 .8 1.0 1.2

MICROSECONDS

19:45:06.1

CHANNEL NO.: 2.0

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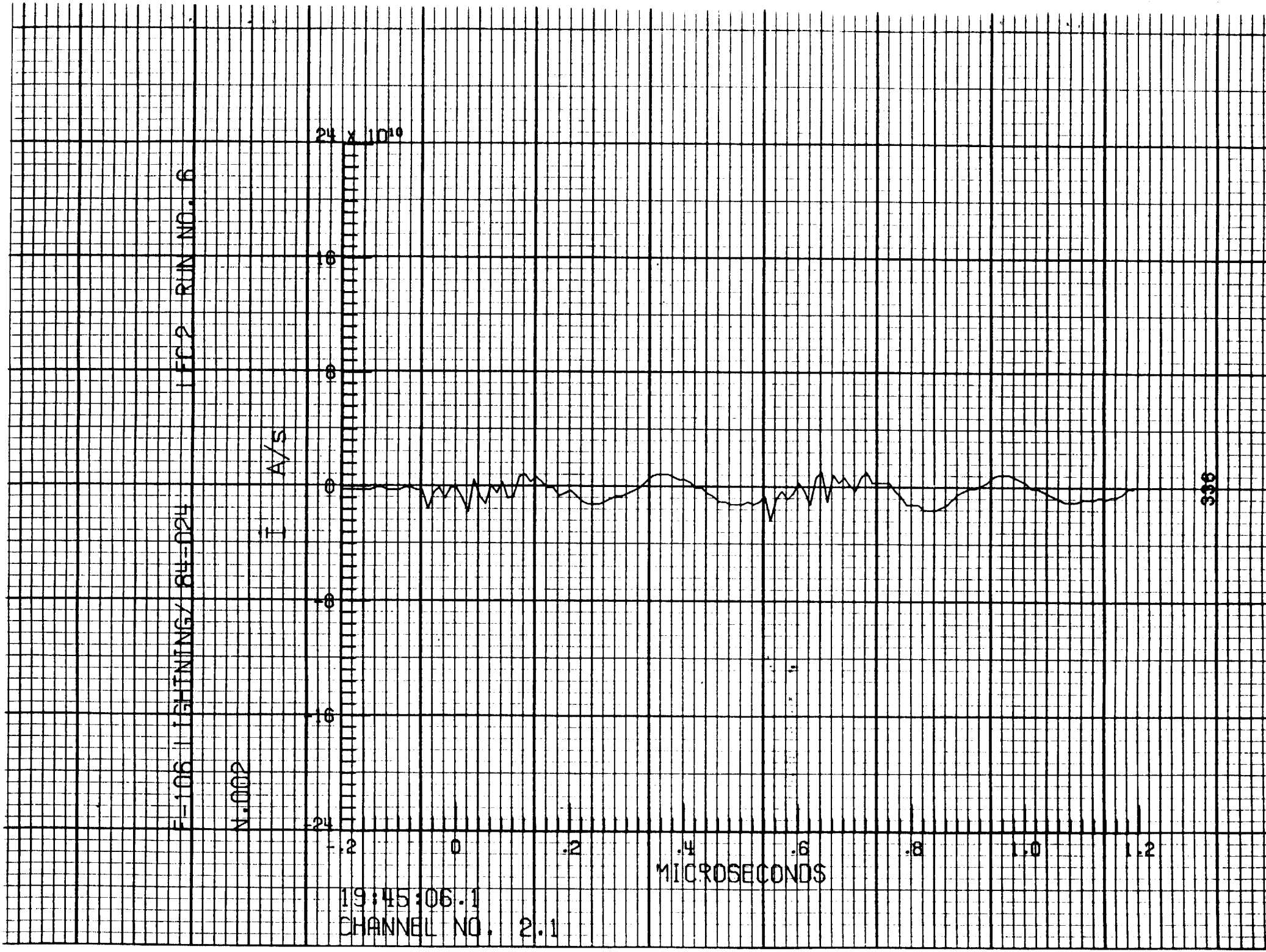
F-106 LIGHTNING/ 84-024 LFC2 RUN NO. 6
N.002
24 x 10^10
16
8
0
-8
-16
-24
A/S
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:45:06.1
CHANNEL NO. 2.1
336

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-024 LFC 2 RUN NO. 6

N.002

B_1 T/s

-1800 -1200 -600 0 600 1200 1800

-.2 0 .2 .4 .6 .8 1.0 1.2

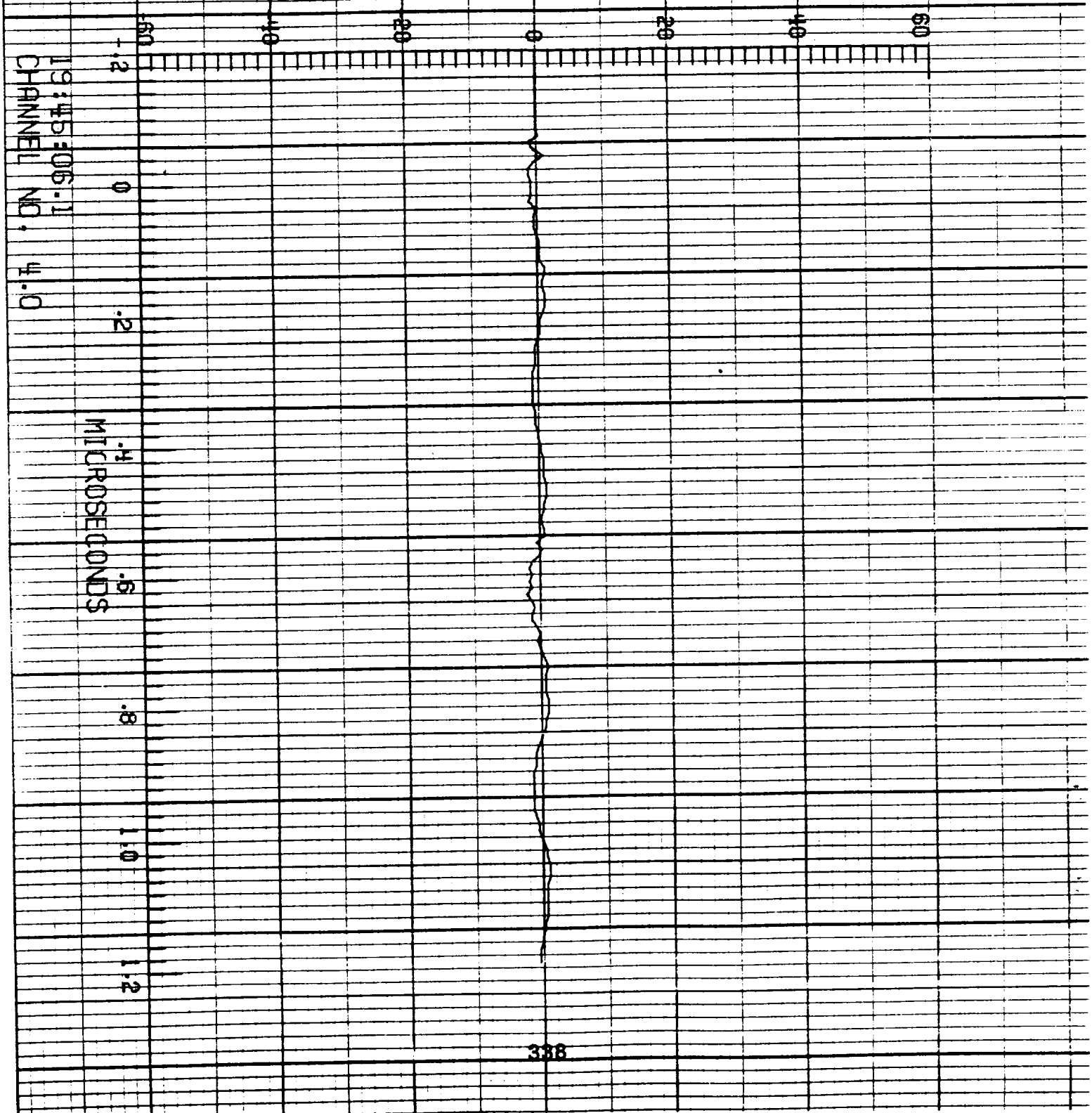
MICROSECONDS

19:45:06.1

CHANNEL NO. 2.2

F-106 LIGHTNING/ 84-024 IFC 4 RUN NO. 6

V.002



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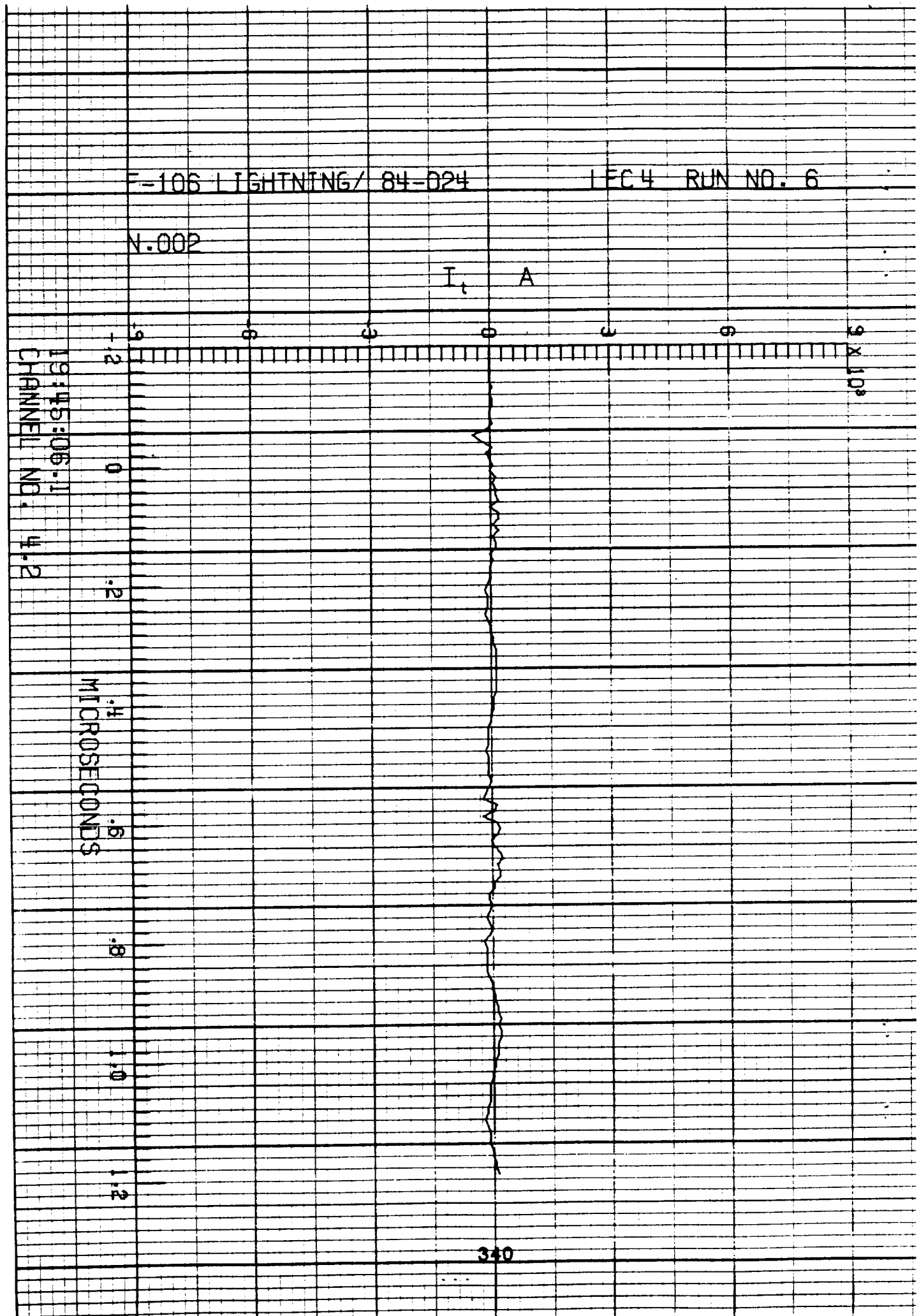
F-106 LIGHTNING/ 84-024 LEC 4 RUN NO. 6

N.002


F-106 LIGHTNING/ 84-024
LEC4 RUN NO. 6
N.002
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:45:06.1
CHANNEL NO. 4.2

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F-106 LIGHTNING/ 84-024 LEC 1 RUN NO. 7

N.008

$\dot{B}_{wt}$ T/S

-800 -600 -400 -200 0 200 400 600 800

-3.2 -2.4 -1.6 -.8 0 .8 1.6 2.4

MICROSECONDS

CHANNEL NO. 1 19:45:38.1

1:1

F-106 LIGHTNING/ 84-024 LFC1 RUN NO. 7

N.008

B_{wr} T/s

-800 -600 -400 -200 0 200 400 600 800

CHANNEL NO. 1 2

-3.2 -2.4 -1.6 -.8 0 .8 1.6 2.4

MICROSECONDS

19:38:11

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-024 IFC2 RUN NO. 7

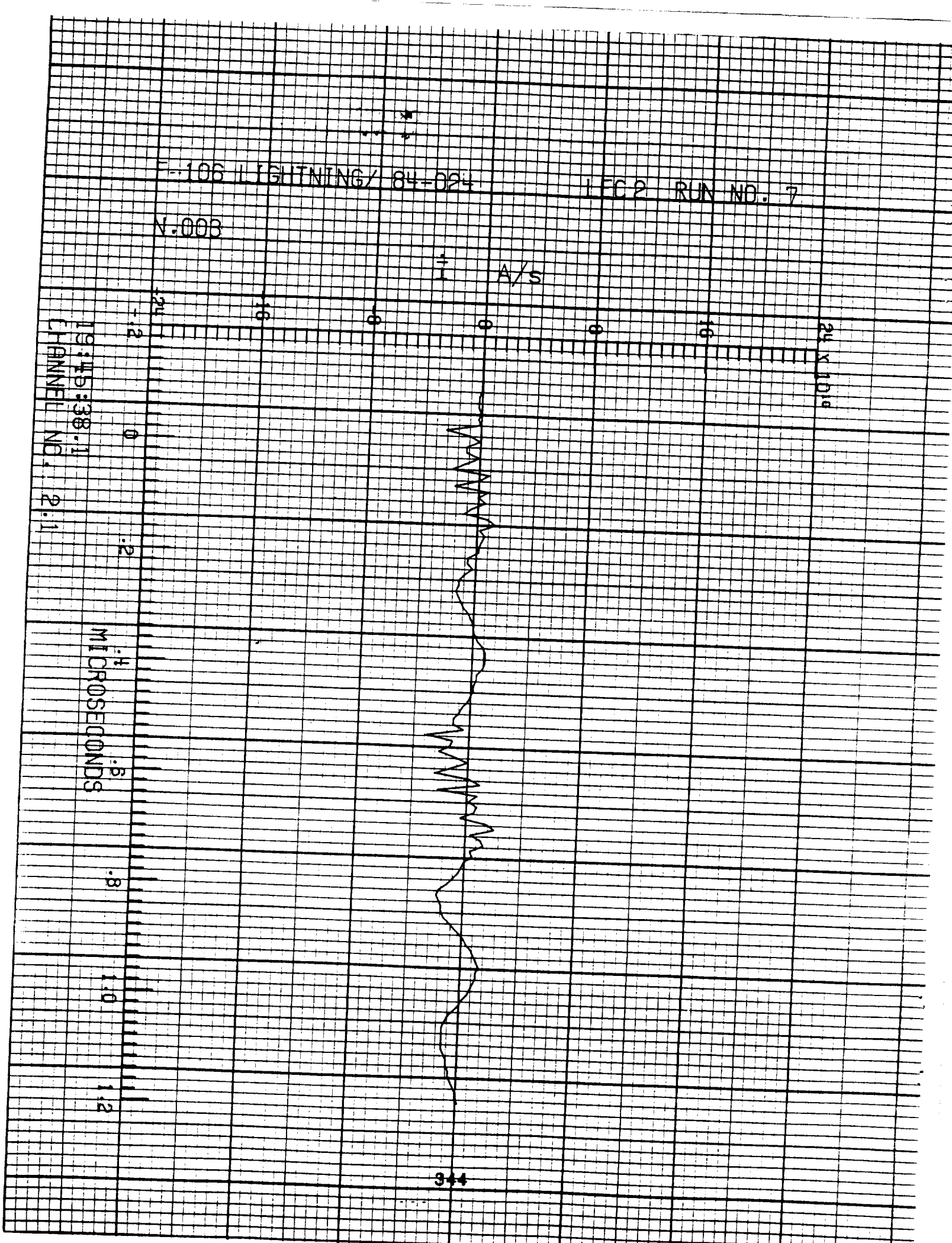
V.003

$\vec{D}_t$ A/m²

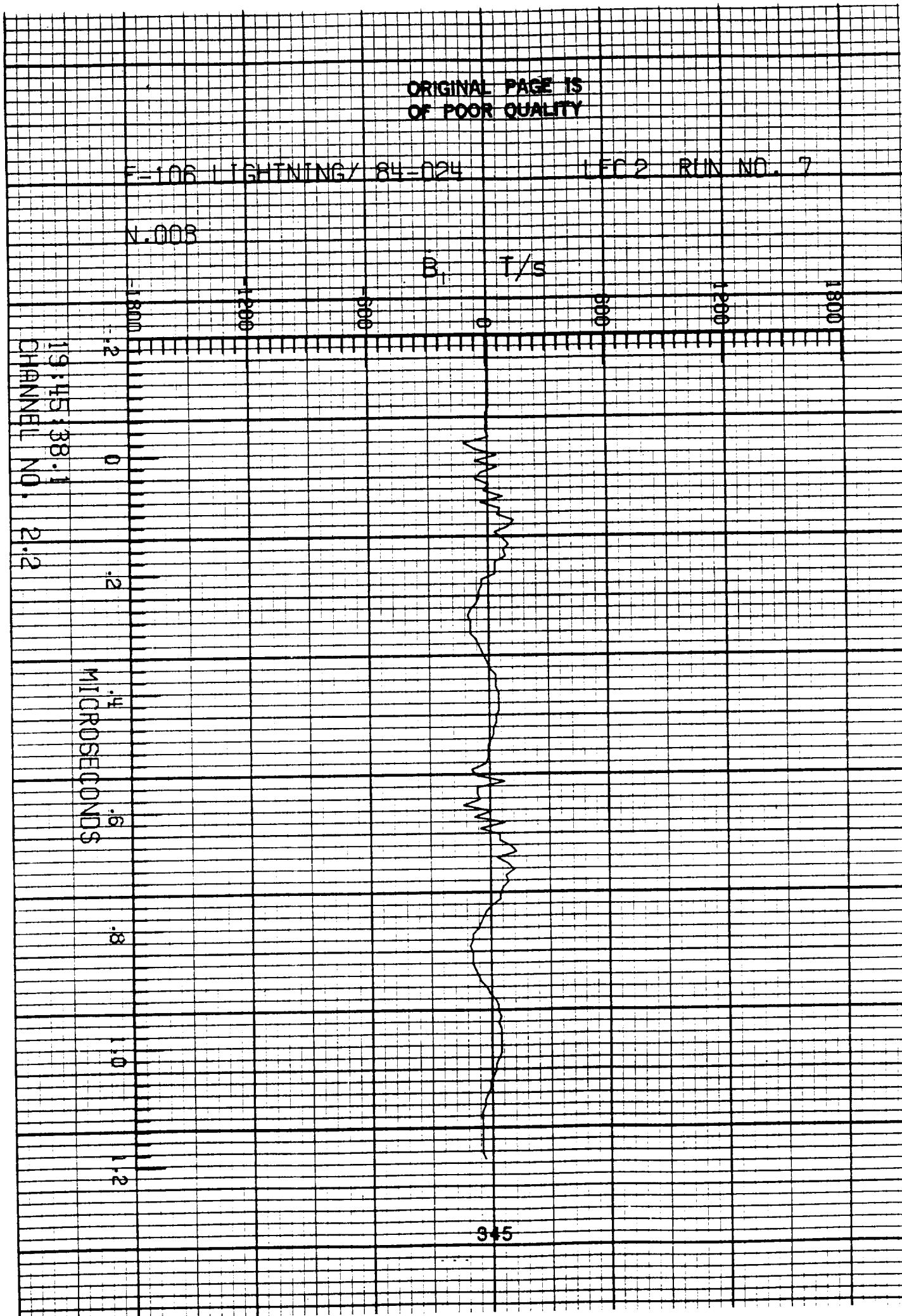
-.2 0 .2 .4 .6 .8 1.0 1.2

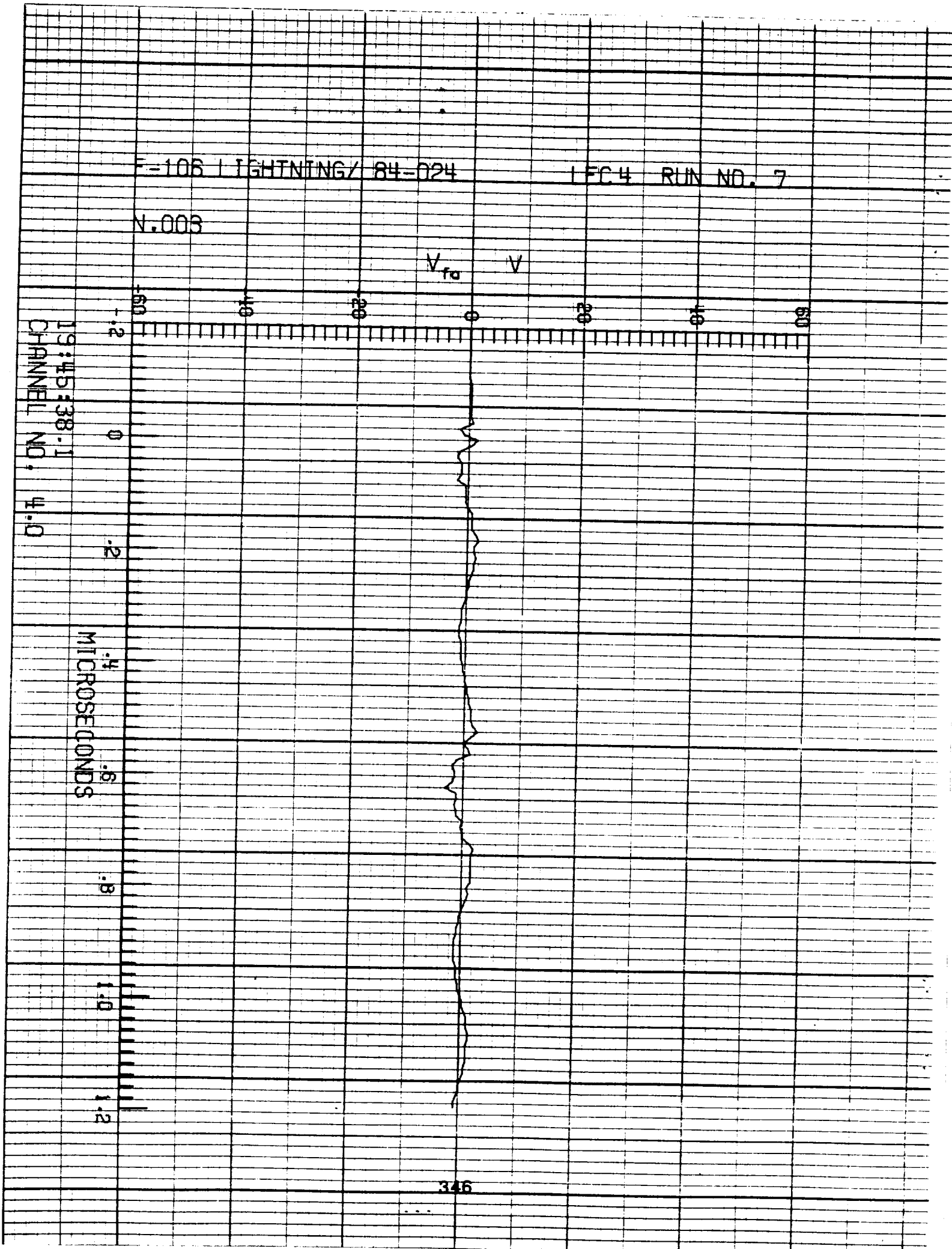
MICROSECONDS

19:45:38.1
CHANNEL NO. 2.0


F-106 LIGHTNING/ 84-024
LEC 2 RUN NO. 7
N.003
A/s
-24
-16
-8
0
8
16
24 x 10^10
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:45:38.1
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-024
LFC4 RUN NO. 7
N.003
V_{fa} V
-60
-40
-20
0
20
40
60
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:45:38.1
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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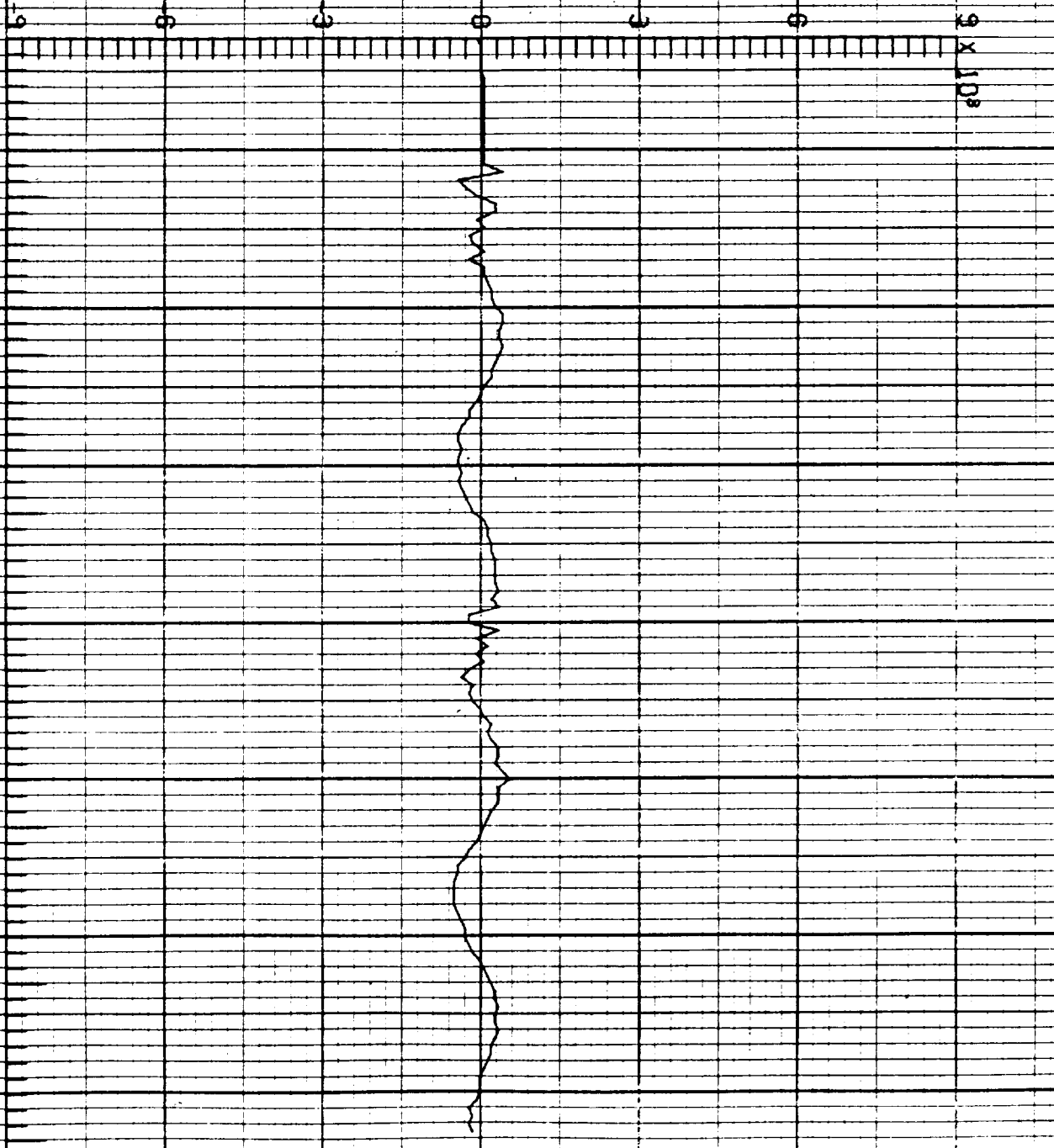
F-106 LIGHTNING/ 84-024 LFC 4 RUN NO. 7

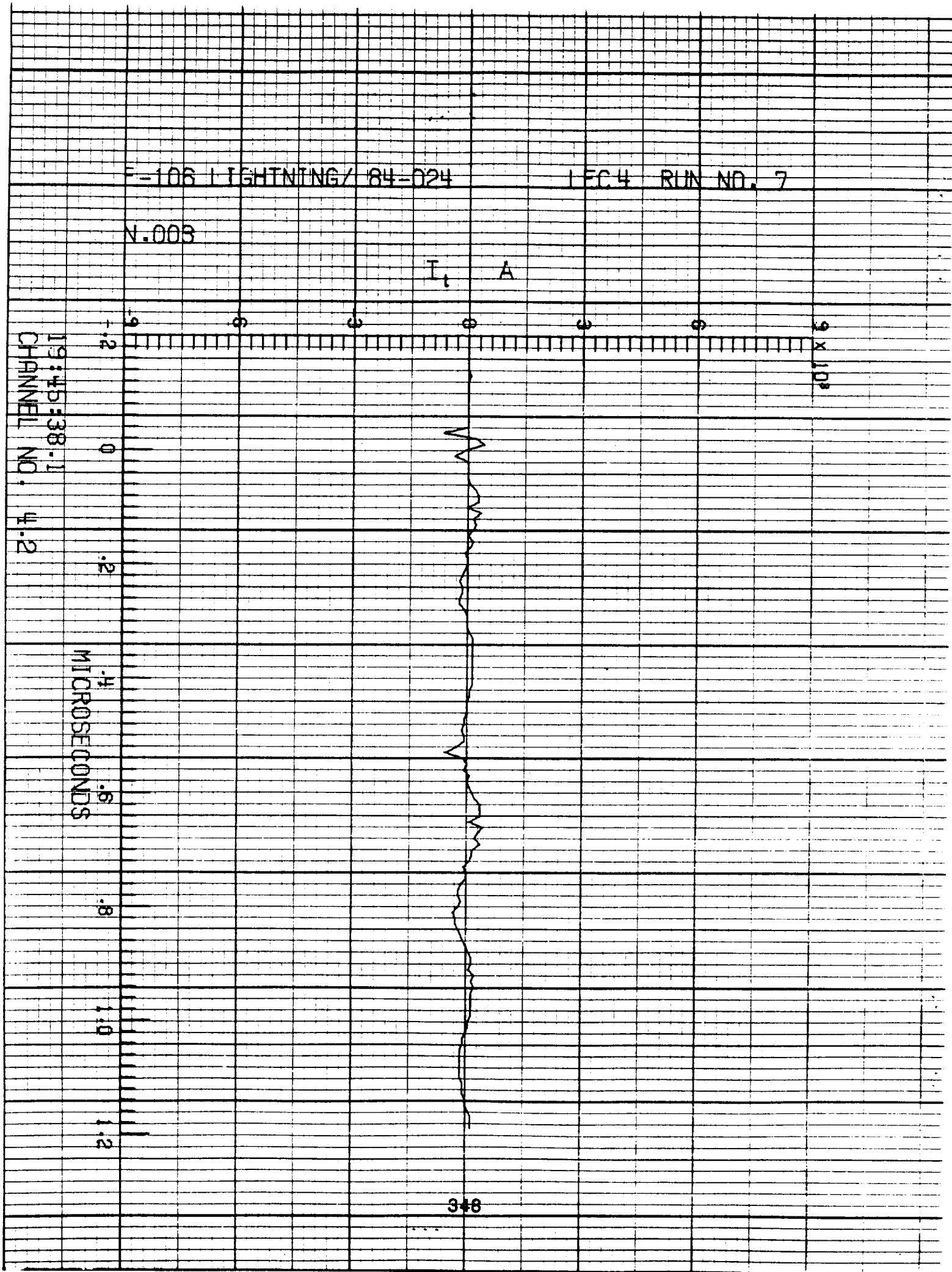
N.008

I_n A



19:45:38.11
CHANNEL NO. 11

MICROSECONDS


F-106 LIGHTNING/ 84-024
LEC4 RUN NO. 7
N.003
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:45:38.1
CHANNEL NO. 4.2

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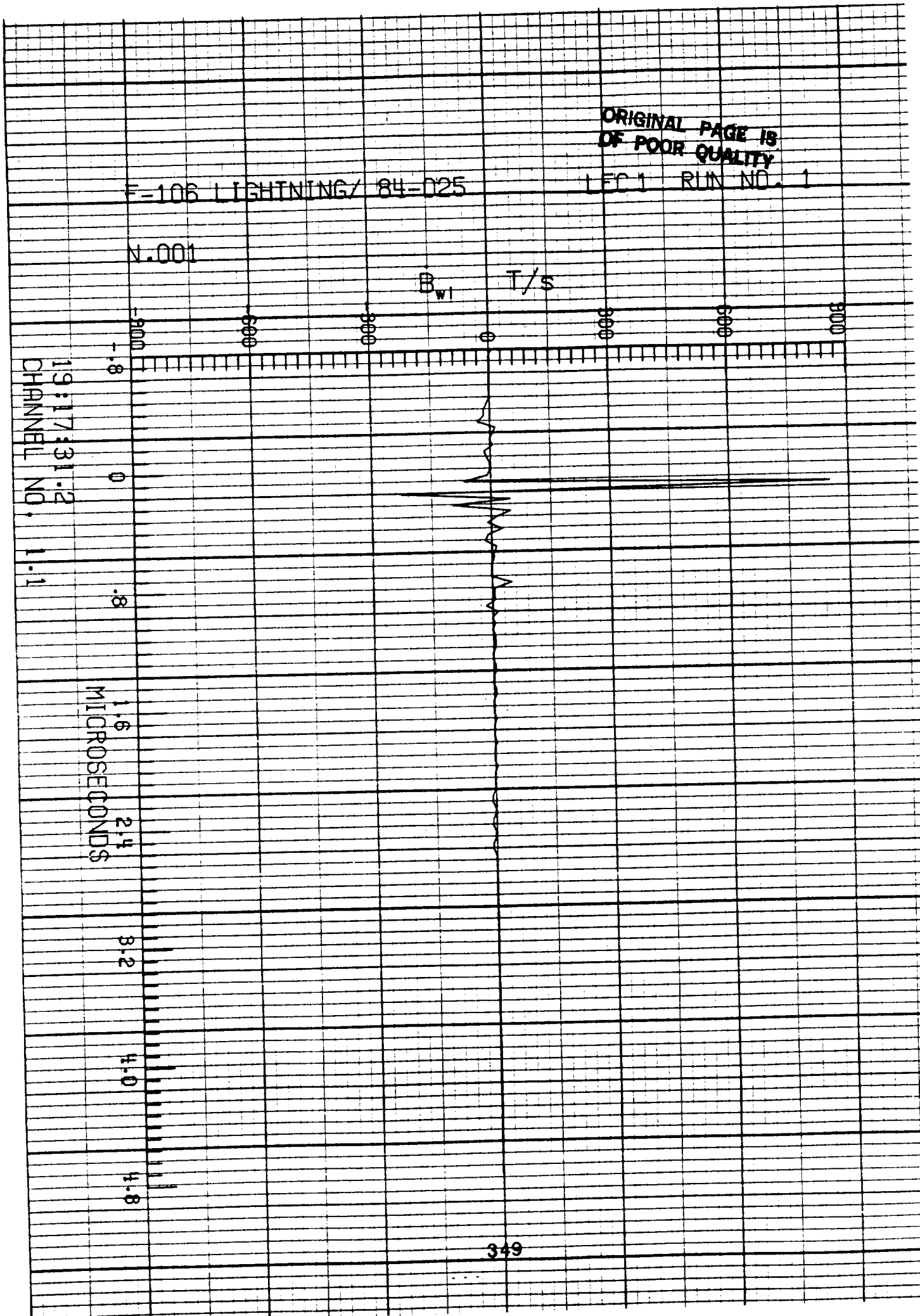

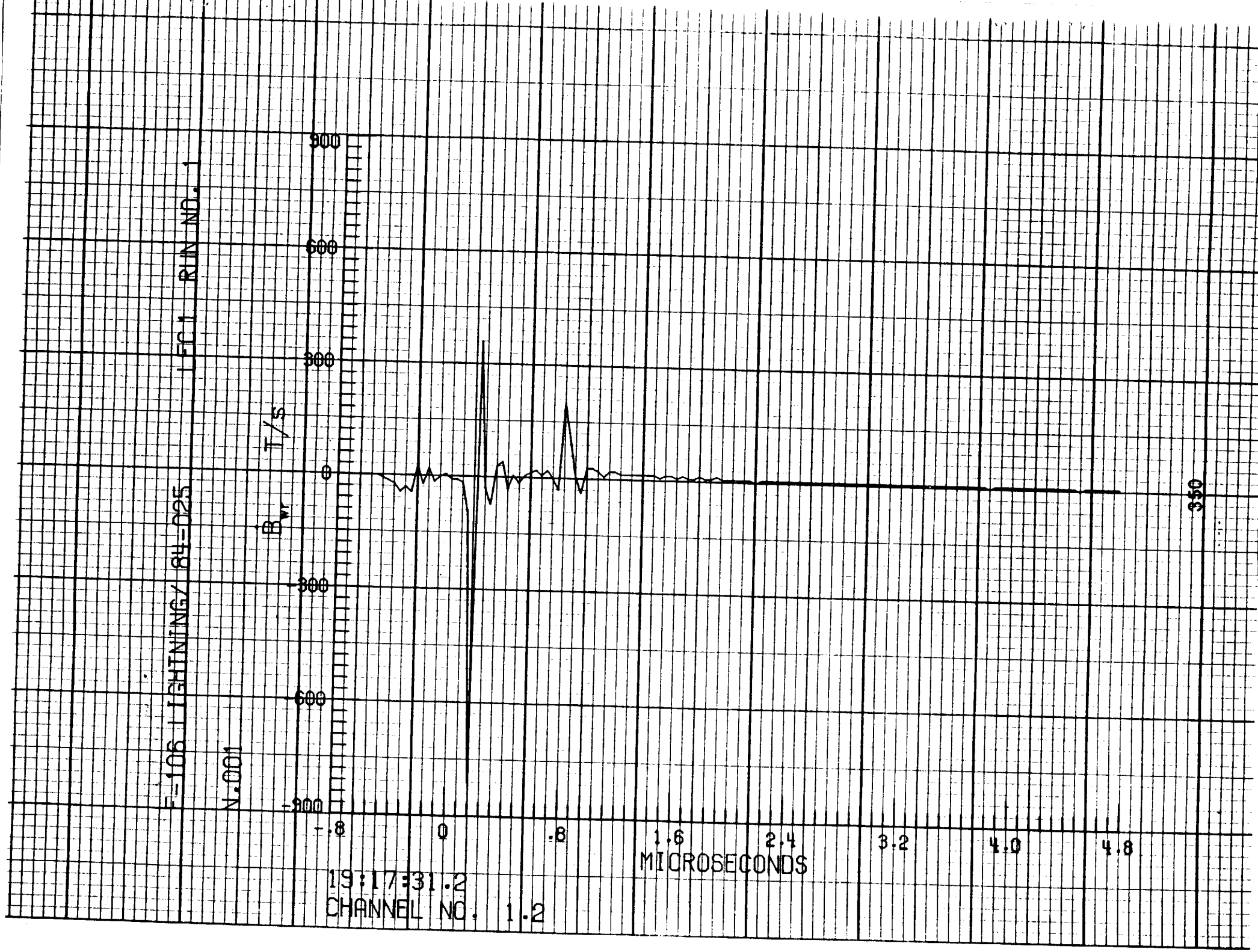
F=106 LIGHTNING/ 84-025 LFC 1 RUN NO. 1
V.001
T/S
B_{WR}
900
600
300
0
-300
-600
-900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
350
MICROSECONDS
19:17:31.2
CHANNEL NO. 1.2

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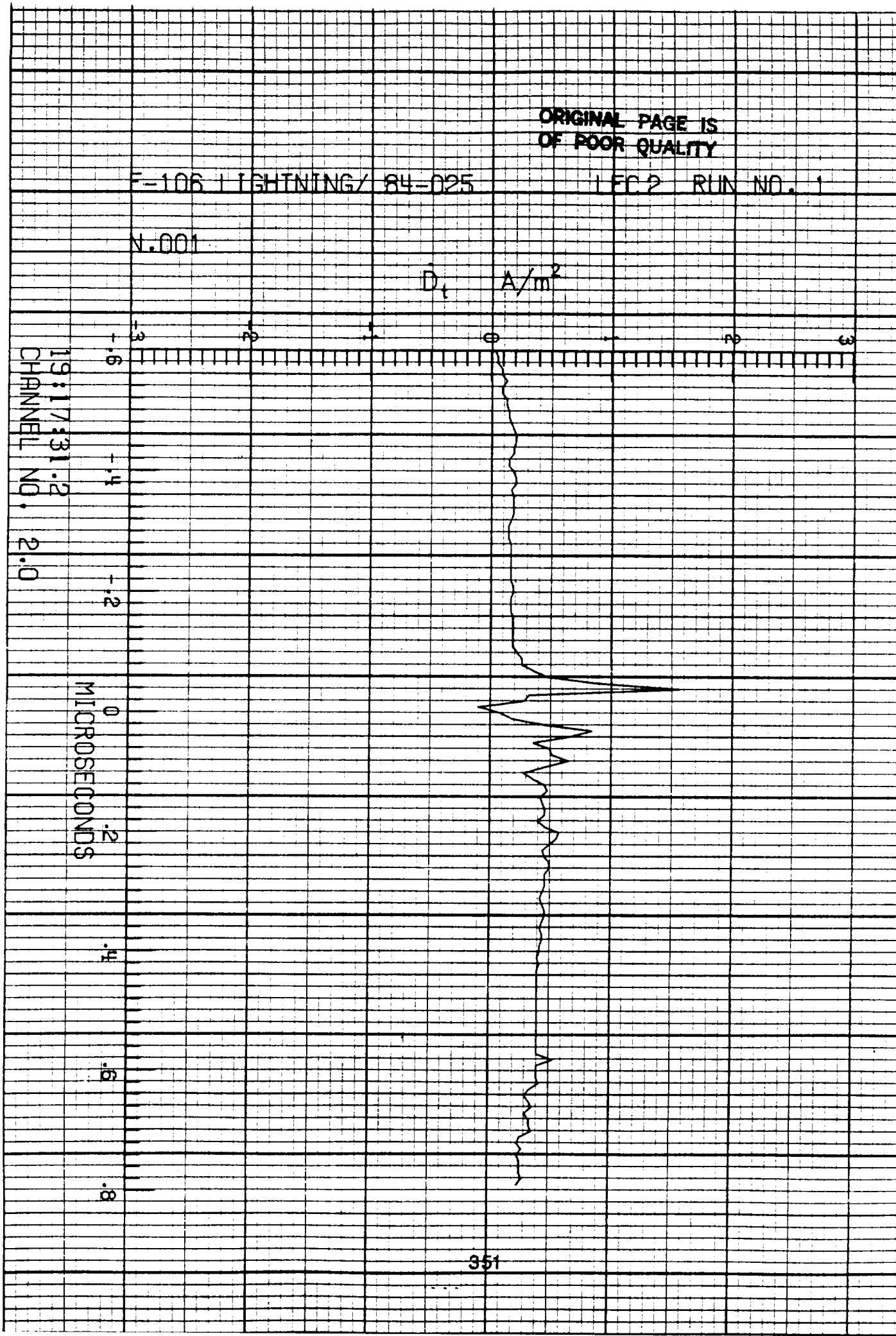

F-106 LIGHTNING/ 84-025 LEC 2 RUN NO. 1

V.001

$\dot{I}$ A/s

-24×10^{10} -16 0 8 16 24×10^{10}

19:17:31.2

CHANNEL NO. 2.1

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

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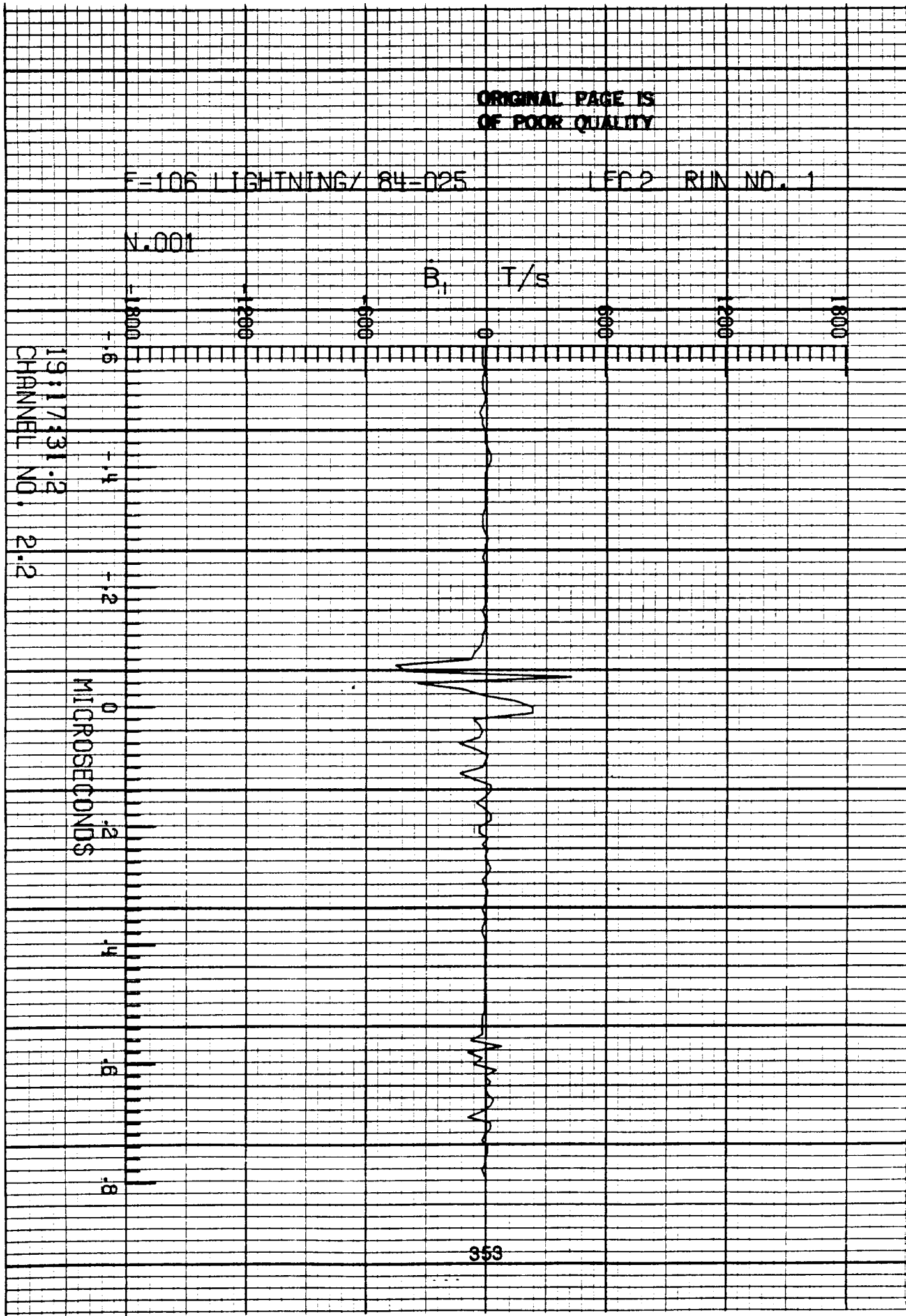

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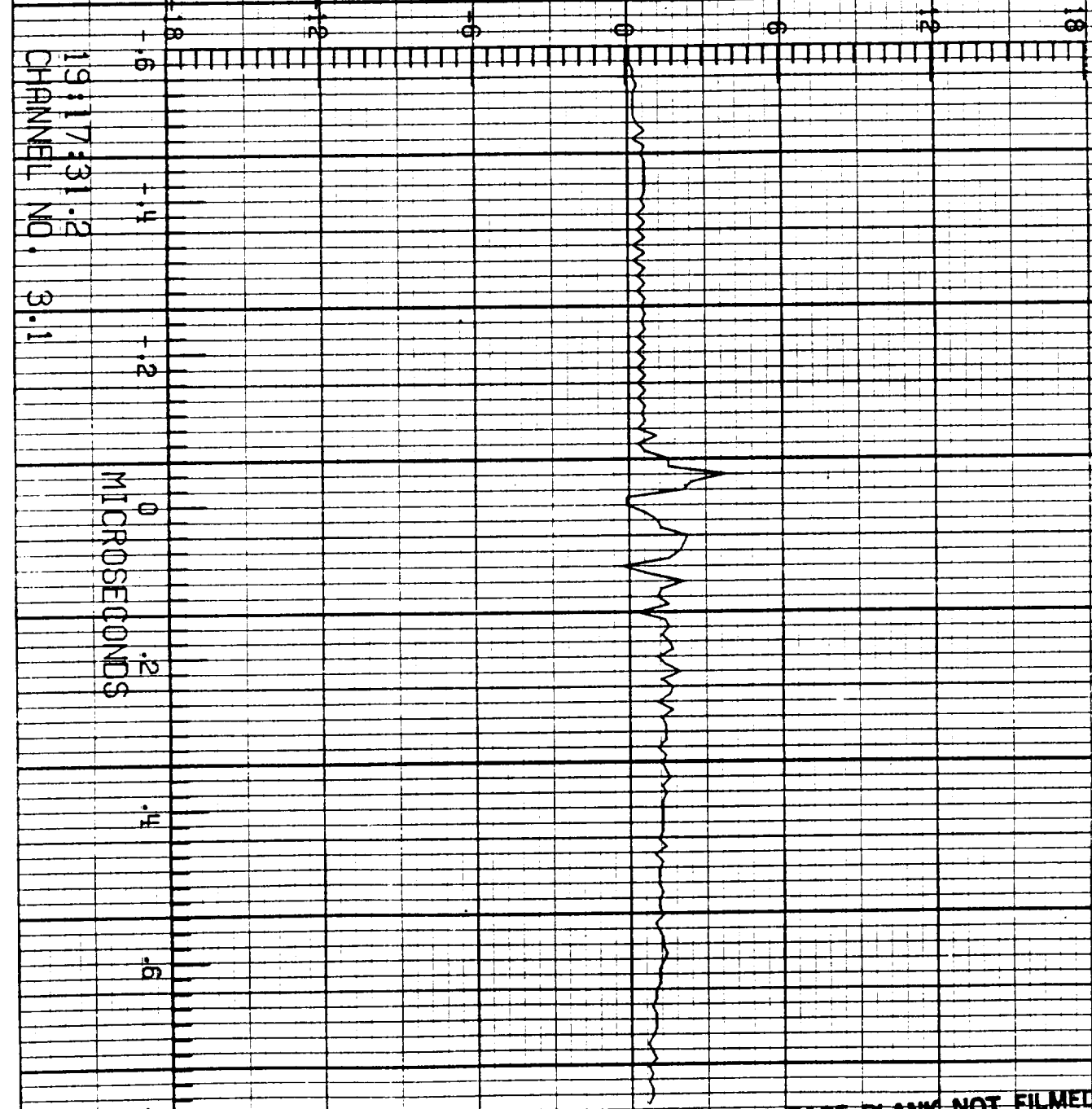
F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 1

N.001

D_{w1} A/m^2



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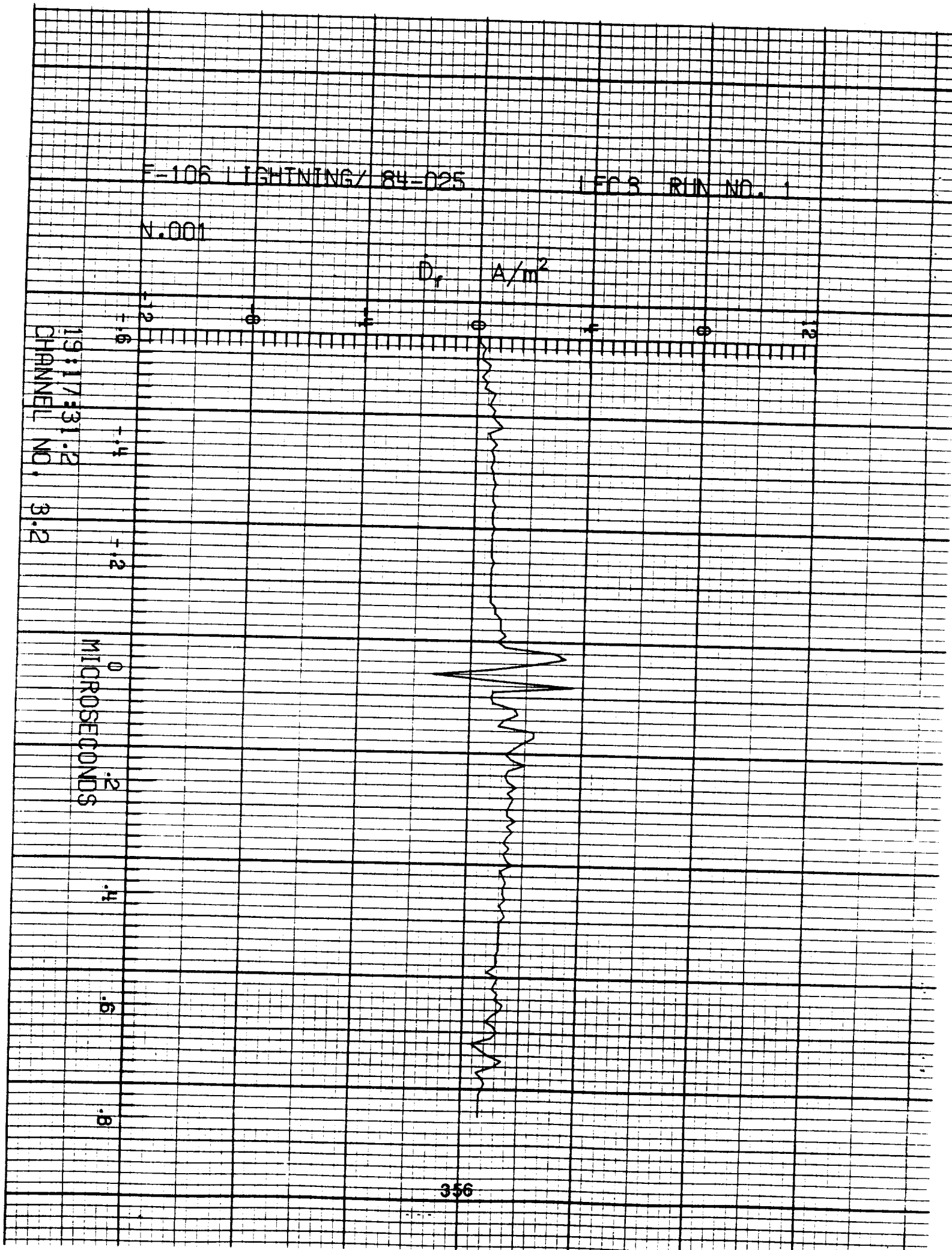
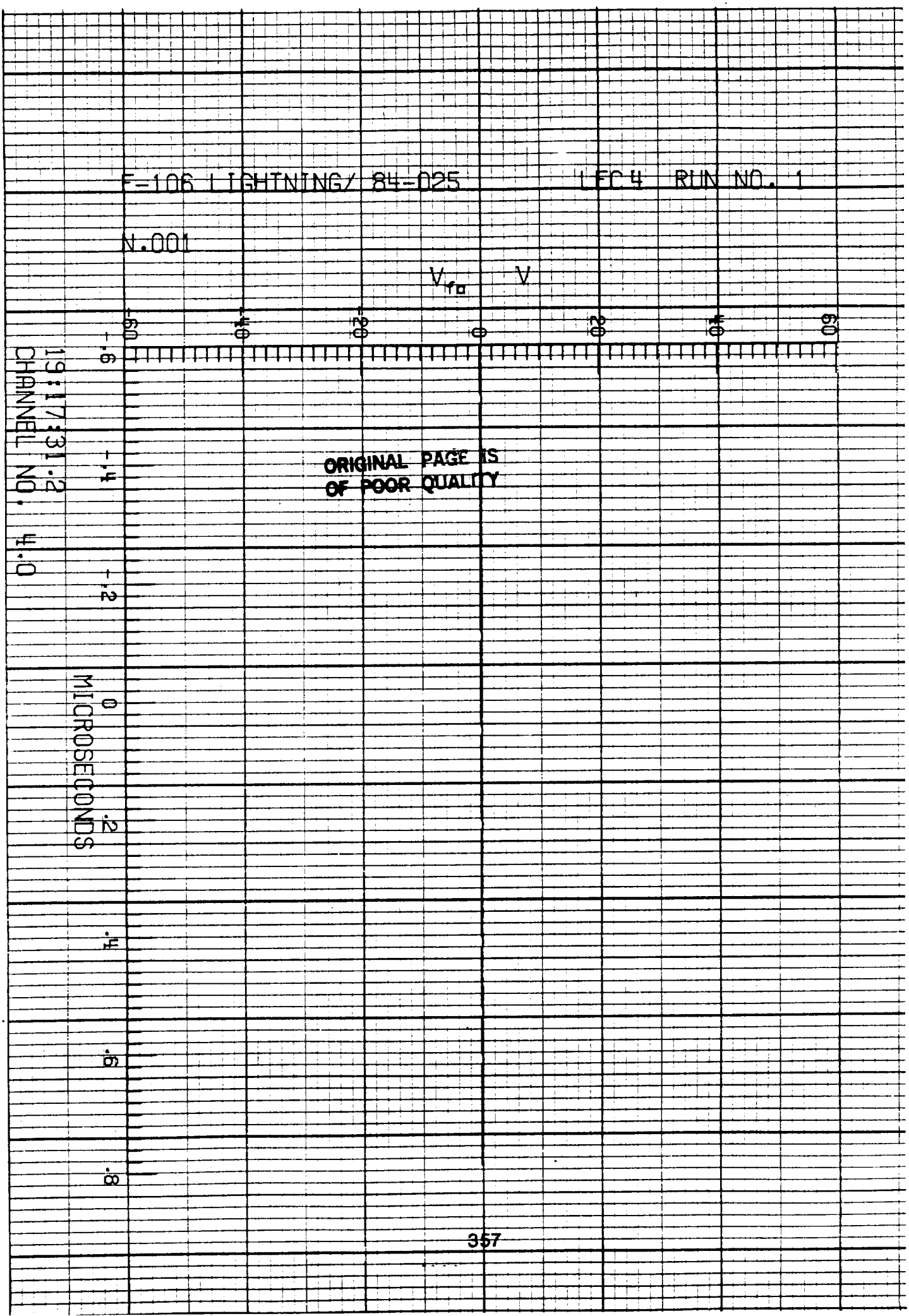

F-106 LIGHTNING/ 84-025 LFC 3 RUN NO. 1
N.001
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
CHANNEL NO. 3.2
19:17:31.2
3.2
2
0
MICROSECONDS
2
4
6
8



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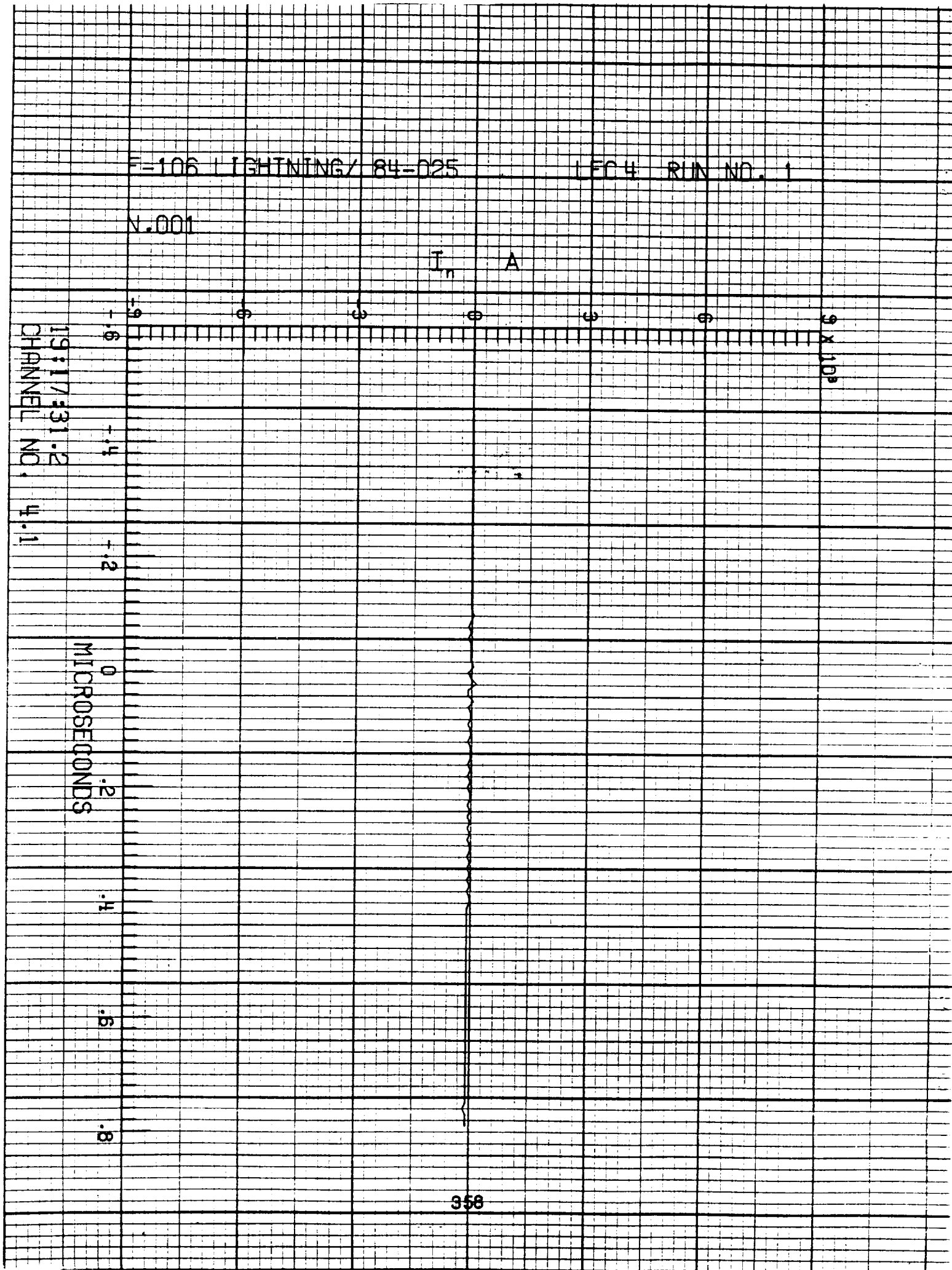
F-106 LIGHTNING/ 84-025
LEC 4 RUN NO. 1
N.001
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:17:31.2
CHANNEL NO. 4.1

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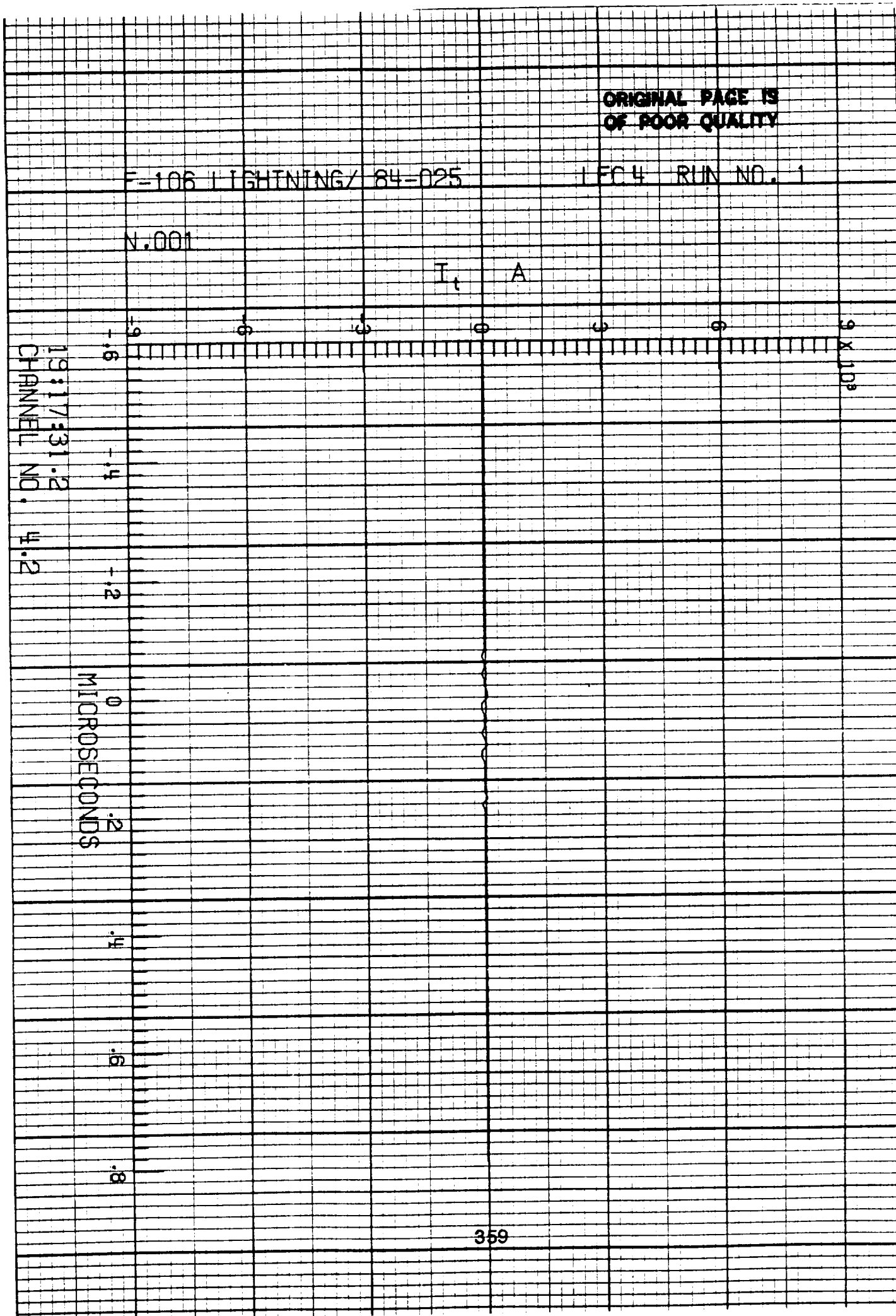

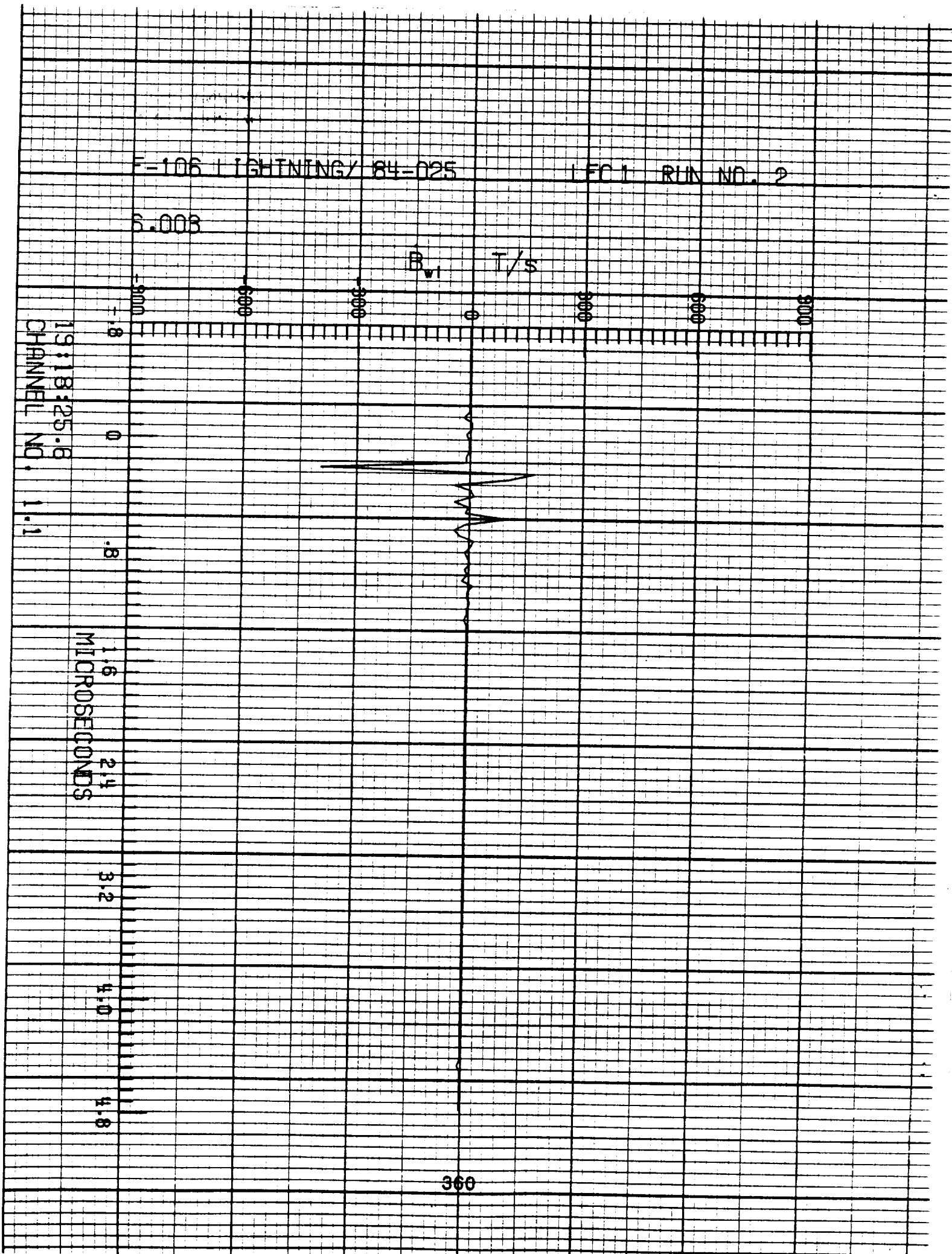
F-106 LIGHTNING/ 84-025
LFC 1 RUN NO. 2
6.008
$\dot{B}_{w1}$ T/S
-.008
0
.008
CHANNEL NO. 1.1
19:18:25.6
MICROSECONDS
8.4
8.3
8.2
8.1
8.0
7.9

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F-106 LIGHTNING/ 84-025 LFC 1 RUN NO. 2

6.003

$\dot{B}_{wr}$ T/s

-800 -600 -400 0 400 600 800

+.8

0

-.8

1.6 MICROSECONDS

2.4

3.2

4.0

4.8

19:18:25.6

CHANNEL NO. 1.2

F-106 LIGHTNING/ 84-025 LFC2 RUN NO. 2

6.003

$\dot{D}_t$ A/m^2

-3 -2 -1 0 1 2 3

-2.6 -2.4 -2.2 0 2.2 2.4 2.6

MICROSECONDS

CHANNEL NO. 2.0 9.9 16:18:25.9

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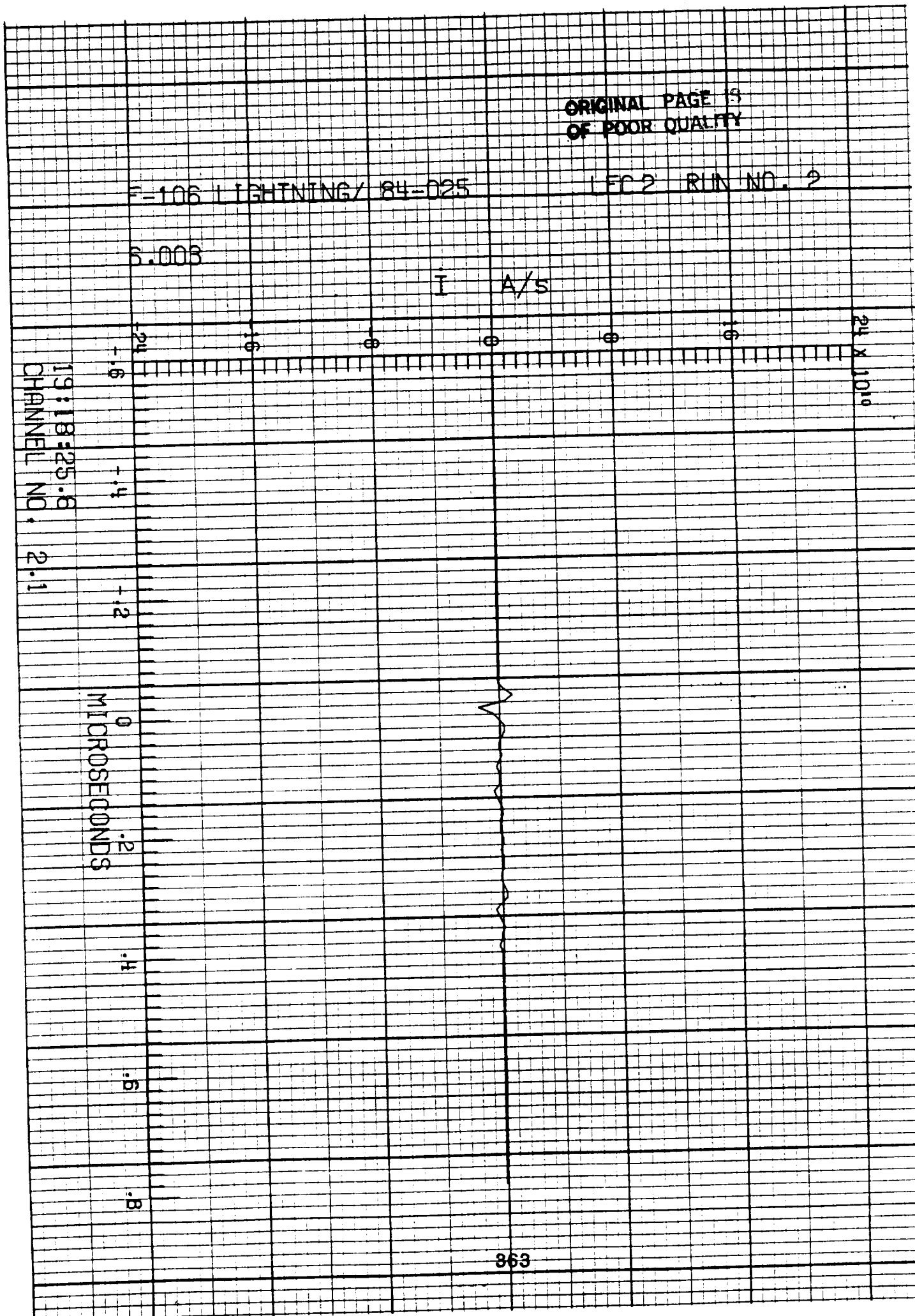

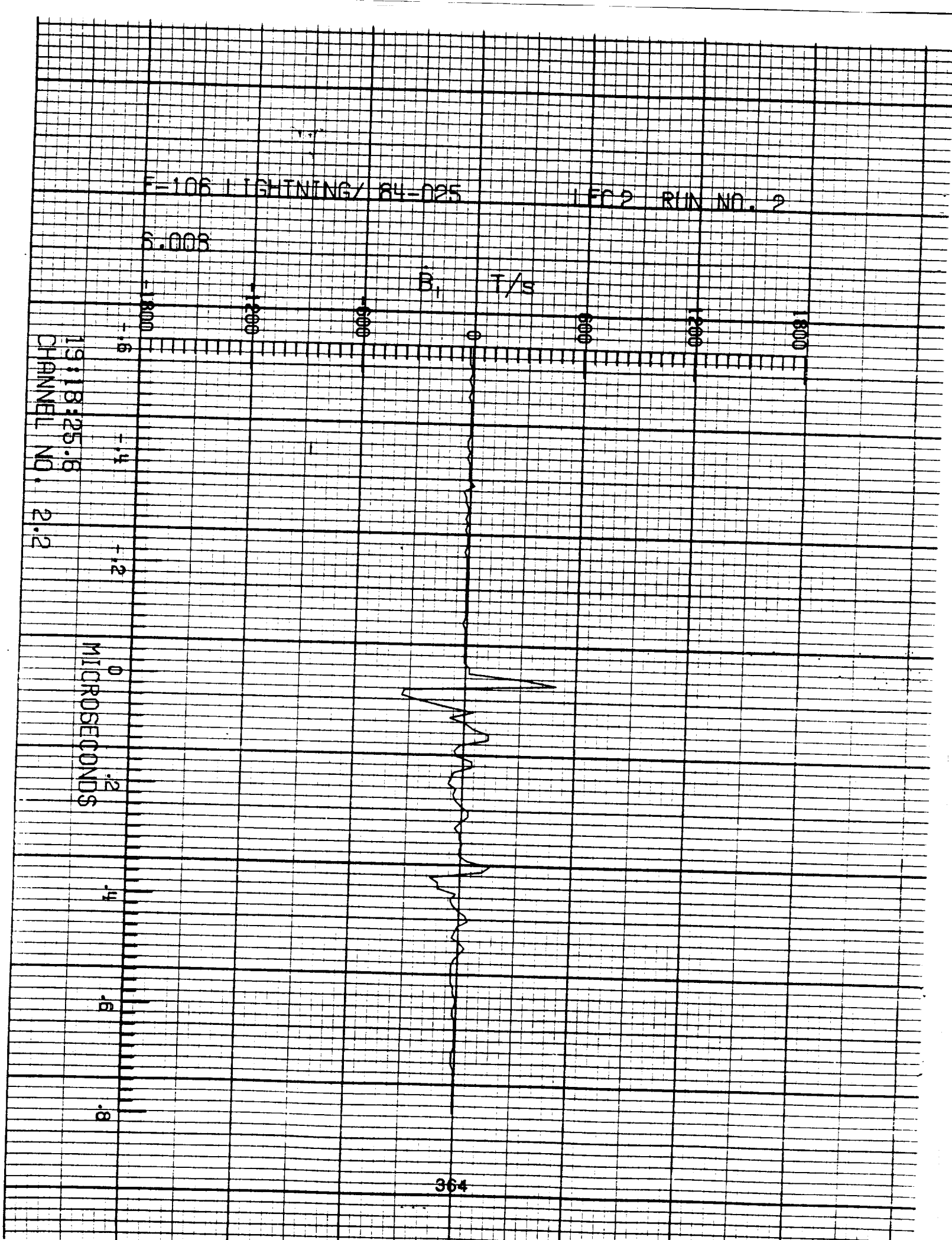
F-106 LIGHTNING/ 84-025
LFC2 RUN NO. 2
6.008
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:18:25.6
CHANNEL NO. 2.2

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F-106 LIGHTNING/ 84-025 LFC B RUN NO. 2

6.003

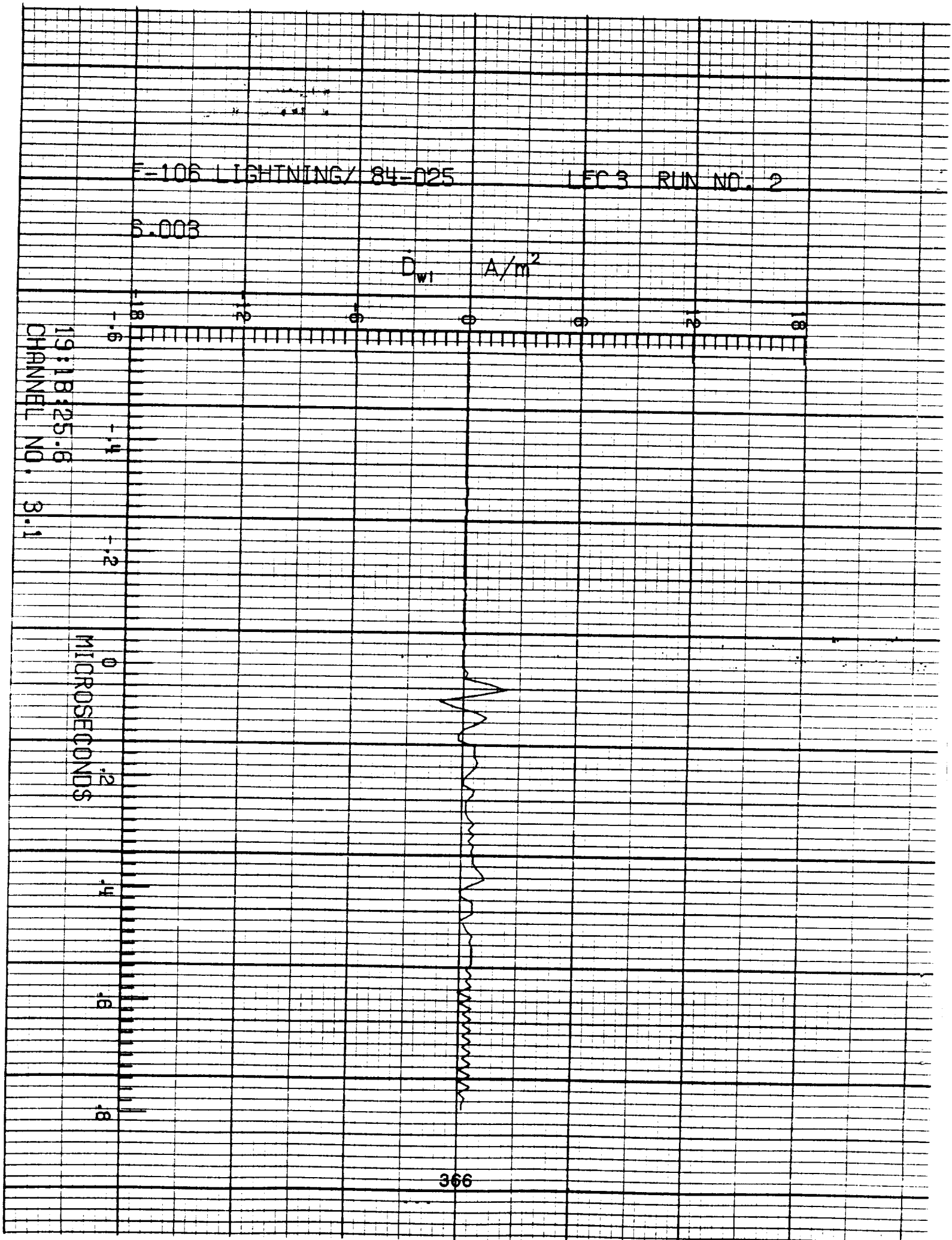
$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-3.6 -3.4 -3.2 -3.0 -2.8 -2.6 -2.4 -2.2 -2.0 -1.8 -1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

CHANNEL NO. 3 19:18:25.6


F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 2
6.003
$\dot{D}_{w1}$ A/m^2
19:18:25.6
CHANNEL NO. 3.1
MICROSECONDS

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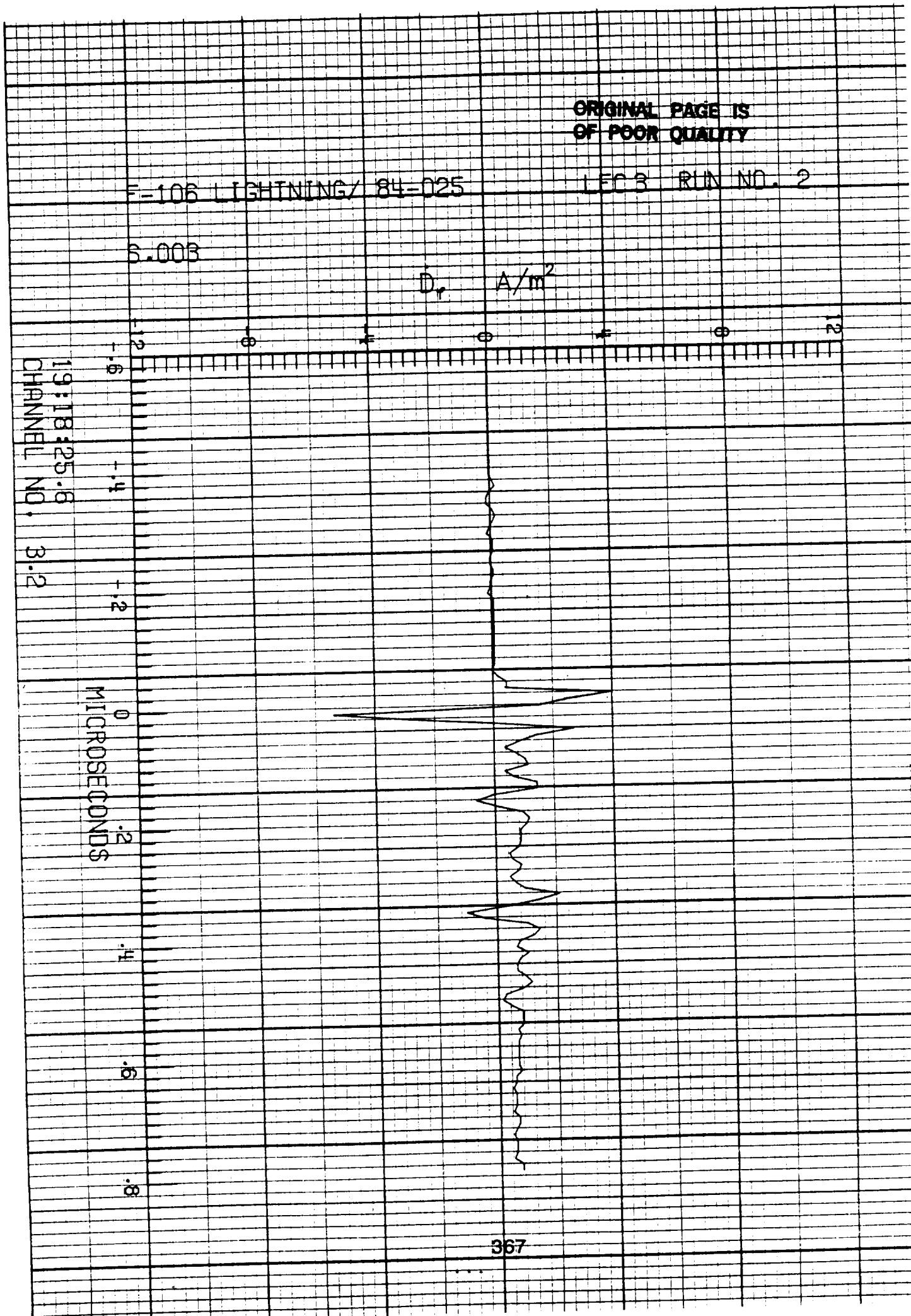
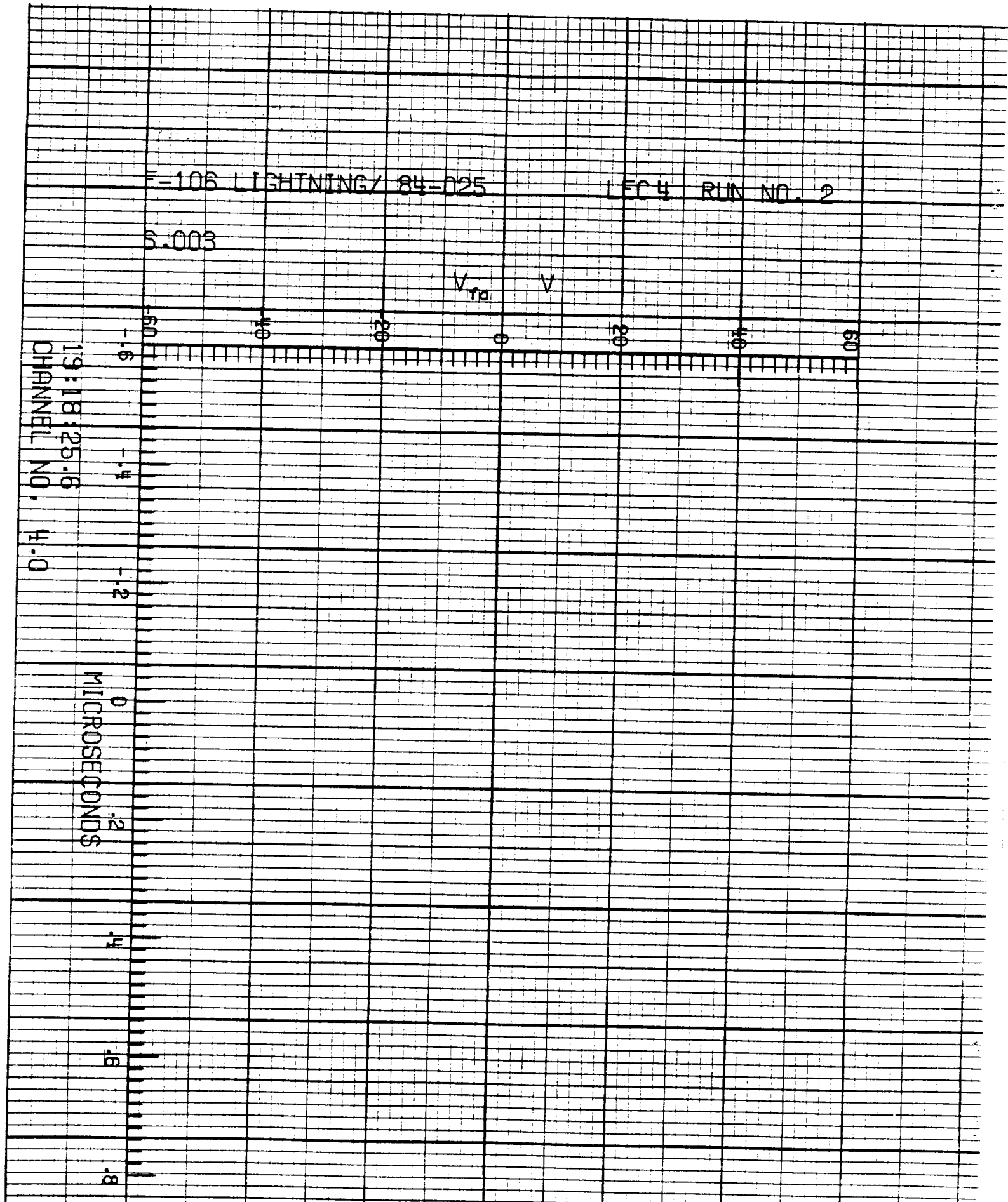



F=106 LIGHTNING/ 84-025
LEC 4 RUN NO. 2
6.003
V_{fa} V
-60
-40
-20
0
20
40
60
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:18:25.6
CHANNEL NO. 4.0

F-106 LIGHTNING/ 84-025 LEC 4 RUN NO. 2

S.003

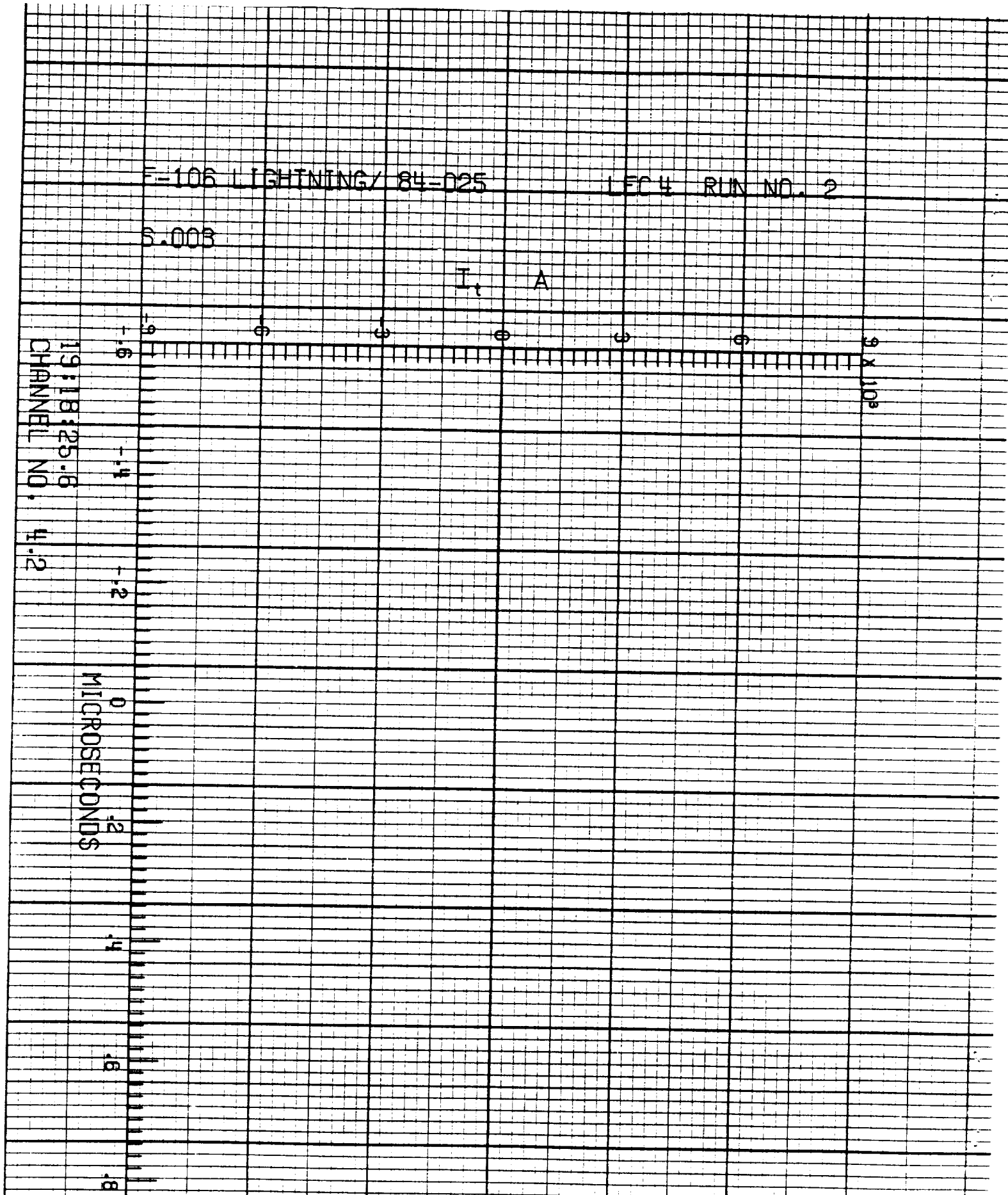
I_n A

-9 -6 -3 0 3 6 9 x 10^3

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

19:18:25.6
CHANNEL NO. 4:1


F-106 LIGHTNING/ 84-025
LEC 4 RUN NO. 2
6.003
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:18:25.6
CHANNEL NO. 4.2

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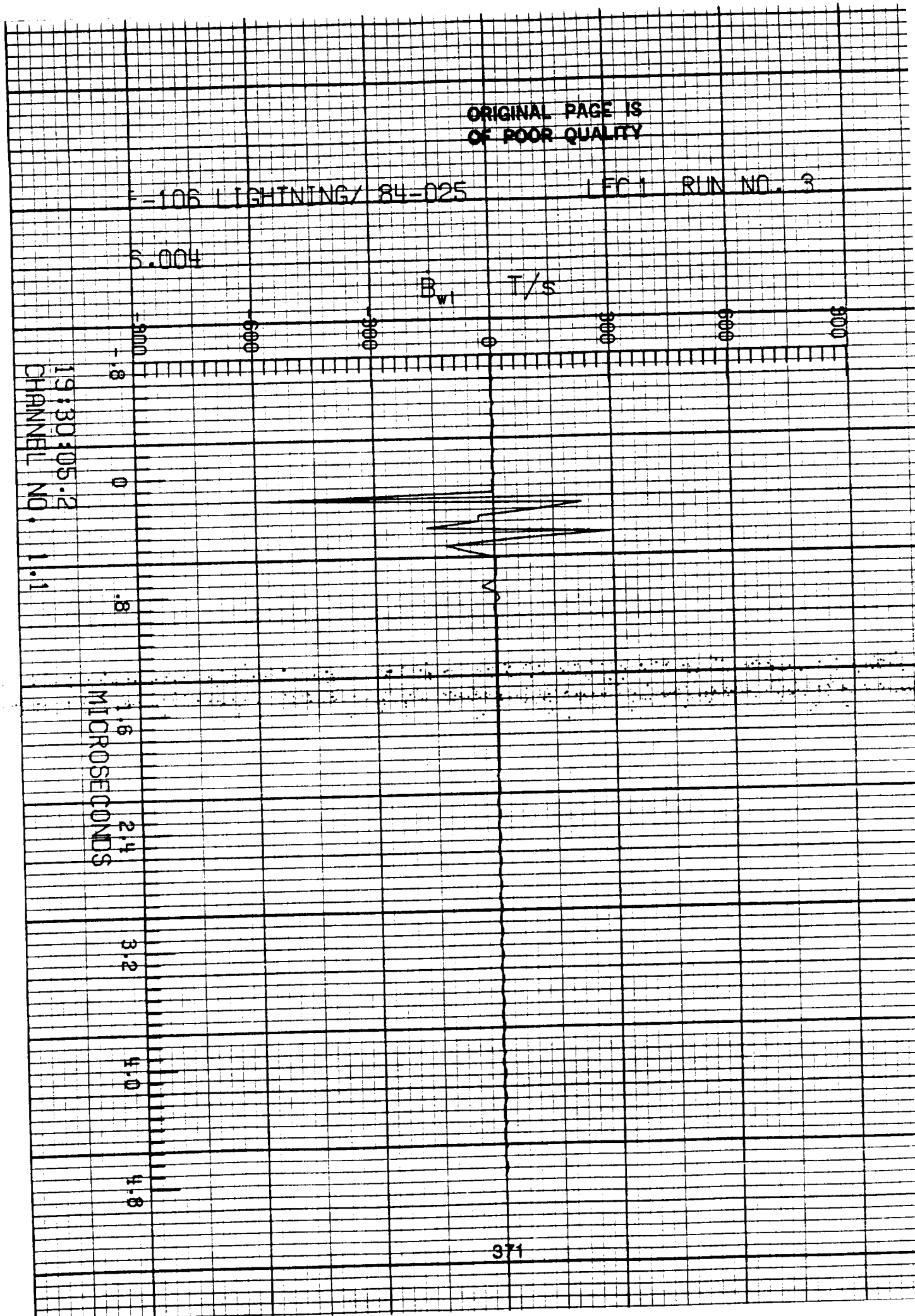

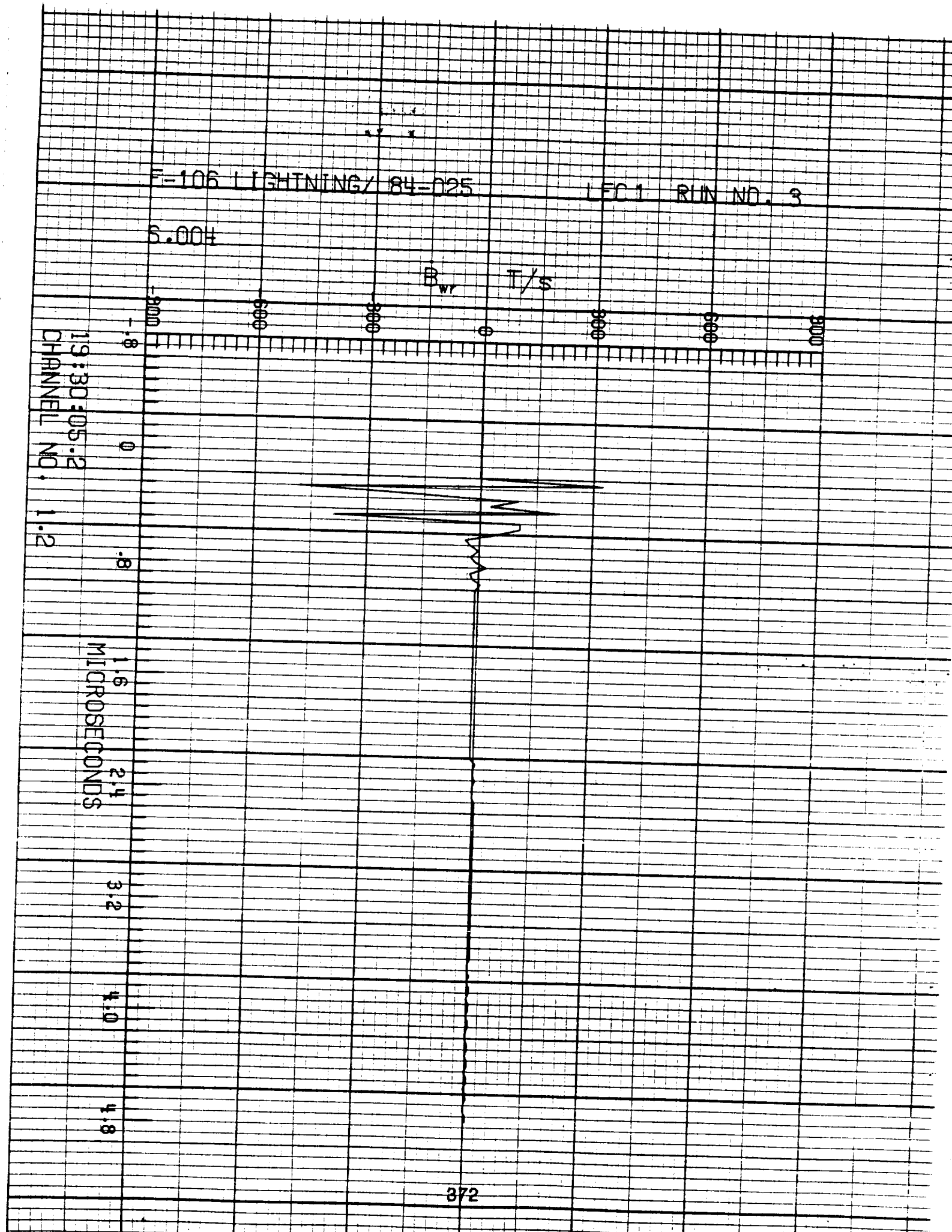
F-106 LIGHTNING/ 84-025
LEC 1 RUN NO. 3
6.004
B_{wr} T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:30:05.2
CHANNEL NO. 1.2

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F-106 LIGHTNING/ 84-025 LFC 2 RUN NO. 3

6.004

D_t A/m^2

-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

19:30:05.2
CHANNEL NO. 2.0

F-106 LIGHTNING/ 84-025 LFC 2 RUN NO. 3

6.004

$\dot{I}$ A/s

$2\mu \times 10^{10}$

19:30:05.2
CHANNEL NO. 2.1

MICROSECONDS

-.4 -.2 0 .2 .4 .6 .8 1.0

F-106 LIGHTNING/ 84-025 FC2 RUN NO. 3

6.004

$\dot{B}_1$ T/s

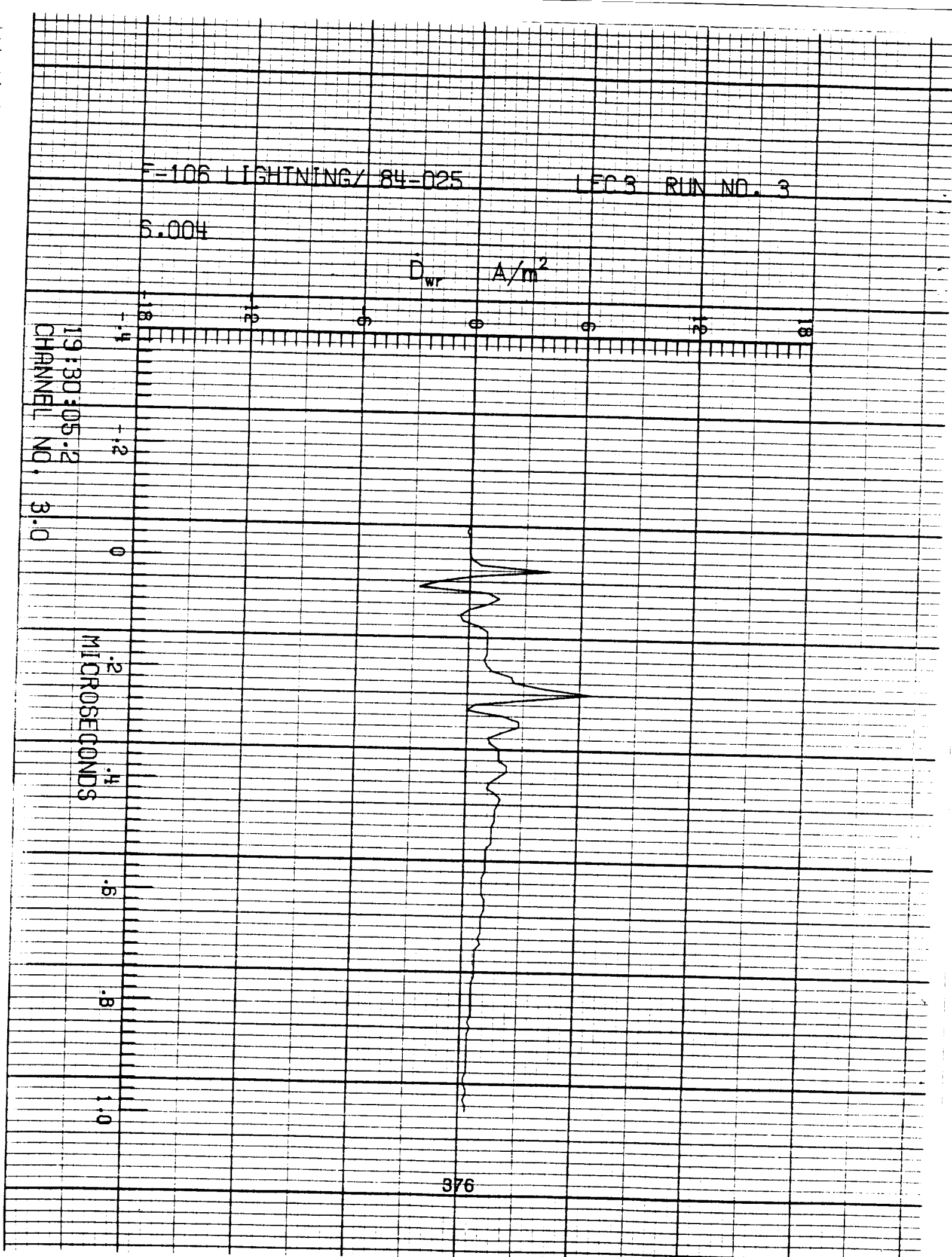
-1800 -1200 -600 0 600 1200 1800

16:30:05.2

CHANNEL NO. 2.2

2.2 0 -.2 -.4 -.6 -.8 -1.0

MICROSECONDS


F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 3
6.004
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:30:05.2
CHANNEL NO. 3.0

ORIGINAL PAGE IS
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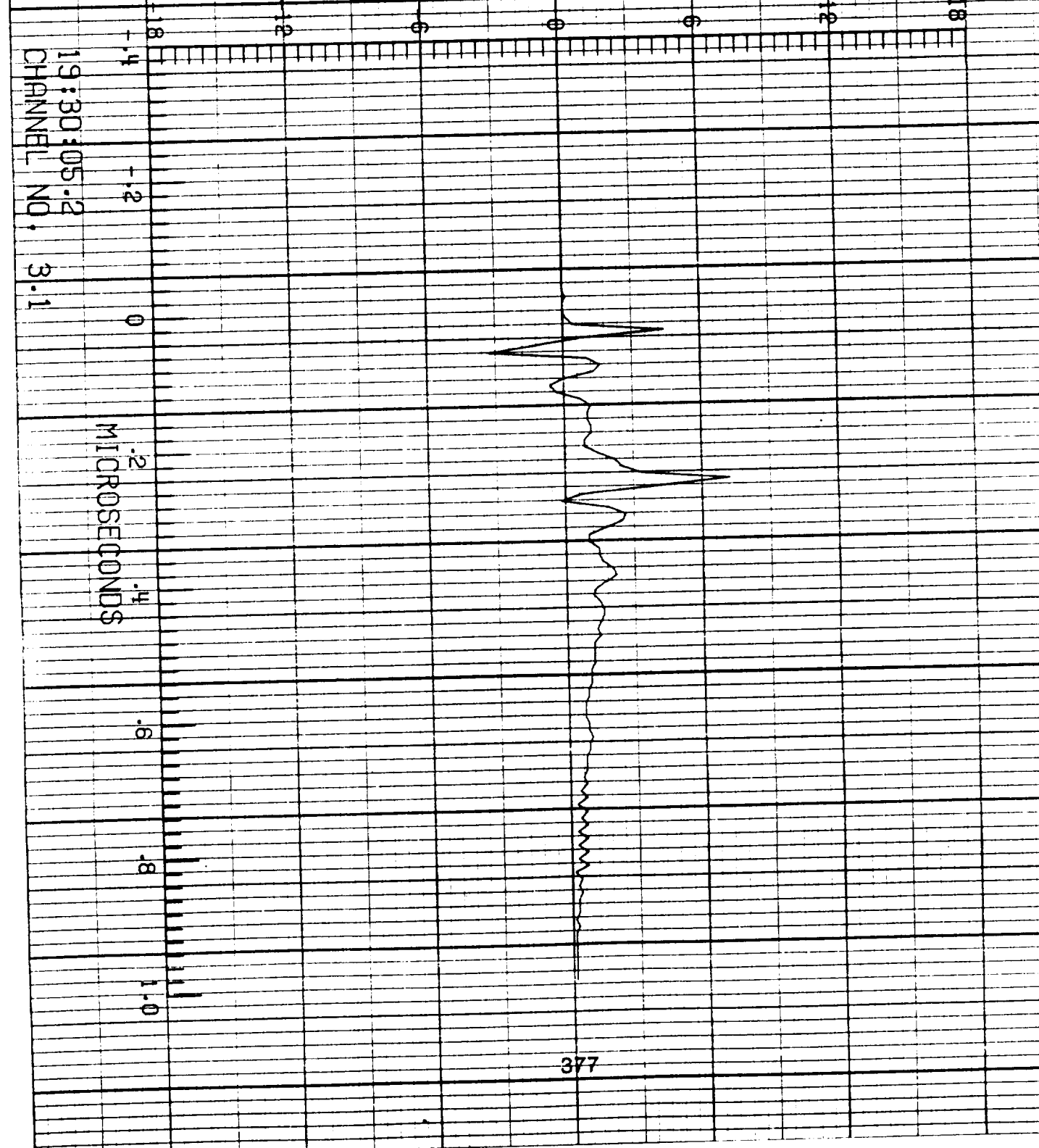
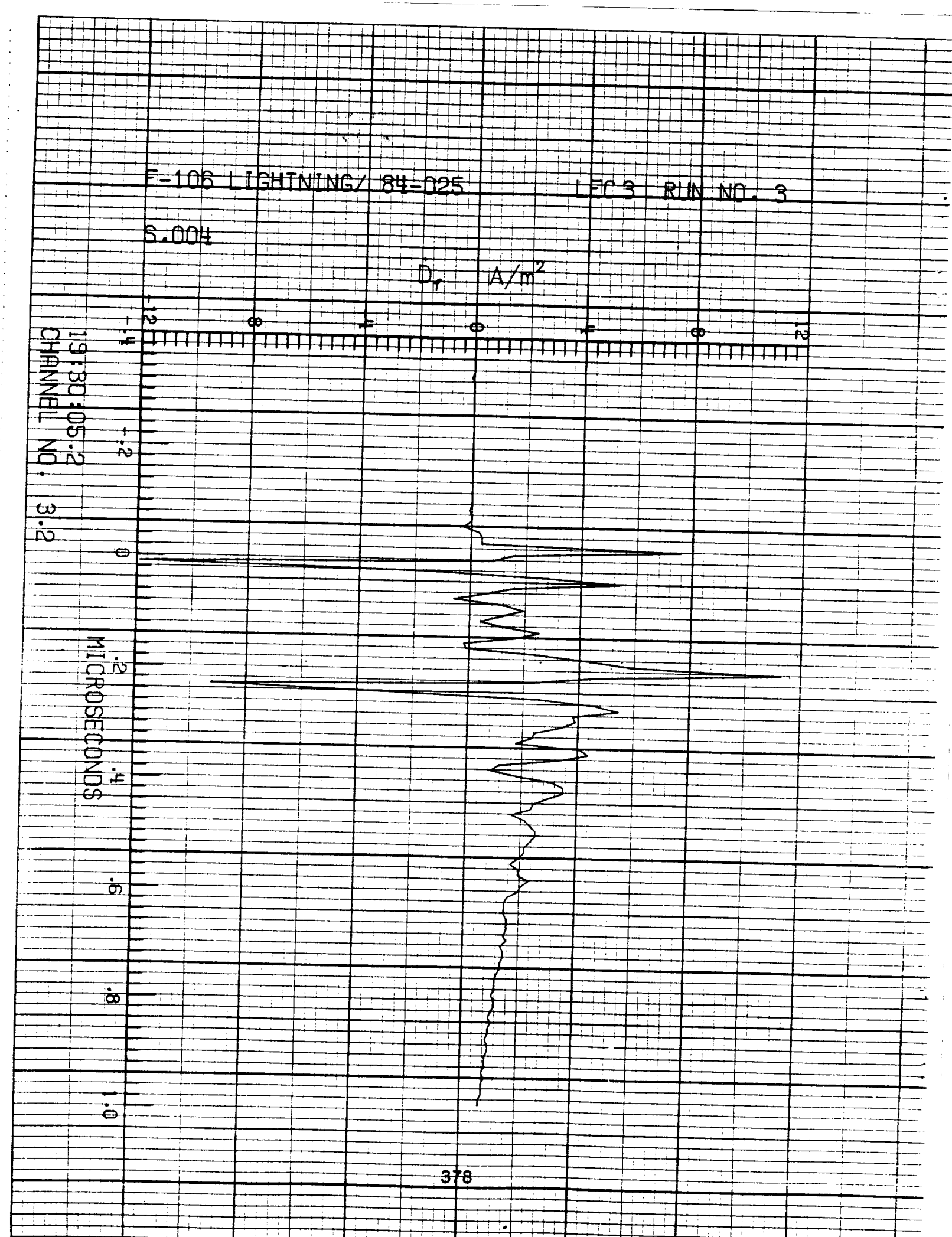
F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 3

6.004

$\bar{D}_{w1}$ A/m^2




F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 3
S.004
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:30:05.2
CHANNEL NO. 3.2

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F-106 LIGHTNING/ 84-025 LFC4 RUN NO. 3

6.004

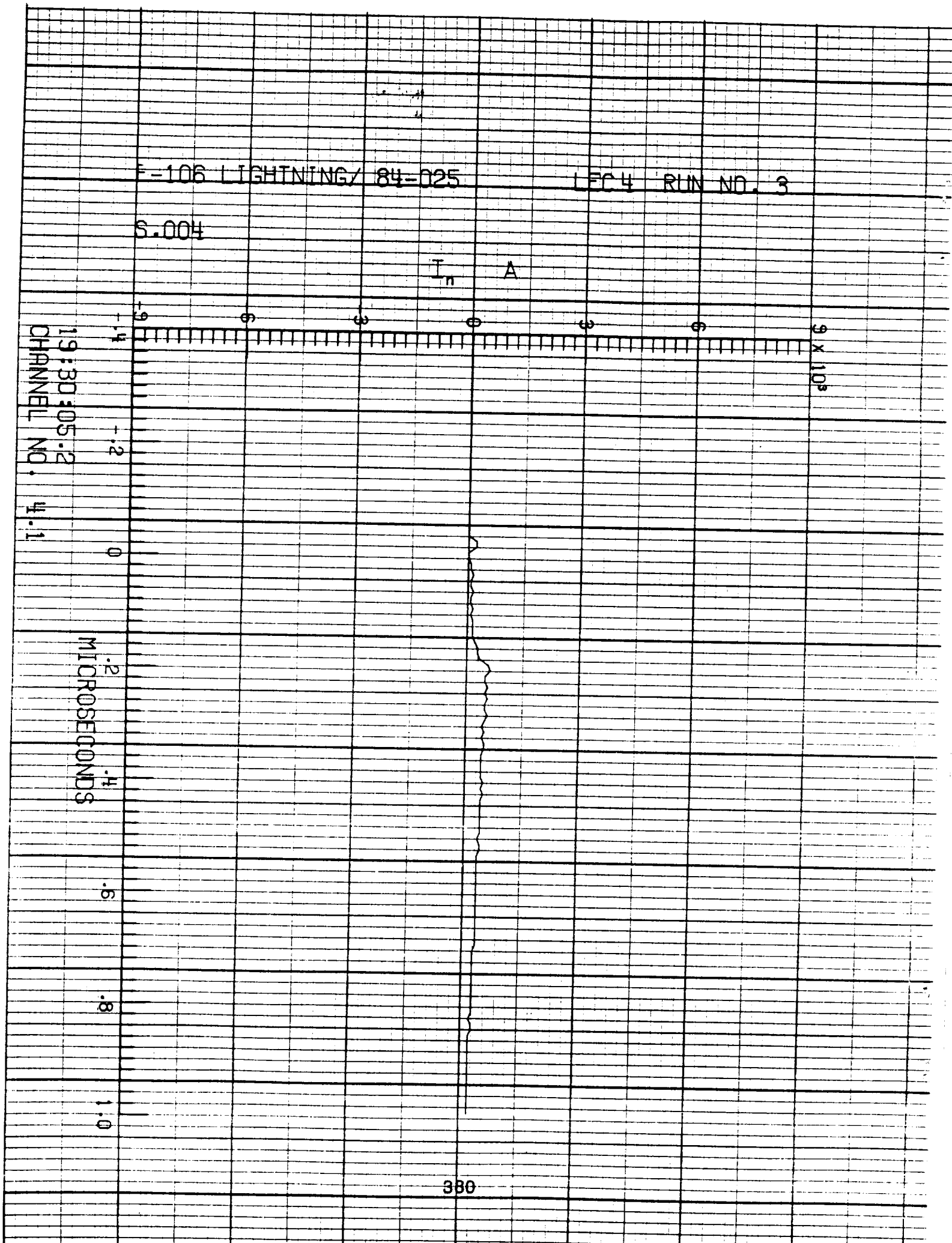
V_{ra} V

-60 -40 -20 0 20 40 60

-1.4 -1.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

119:30:05.2
CHANNEL NO. 4.0


F-106 LIGHTNING/ 84-025
LEC4 RUN NO. 3
S.004
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:30:05.2
CHANNEL NO. 4.1

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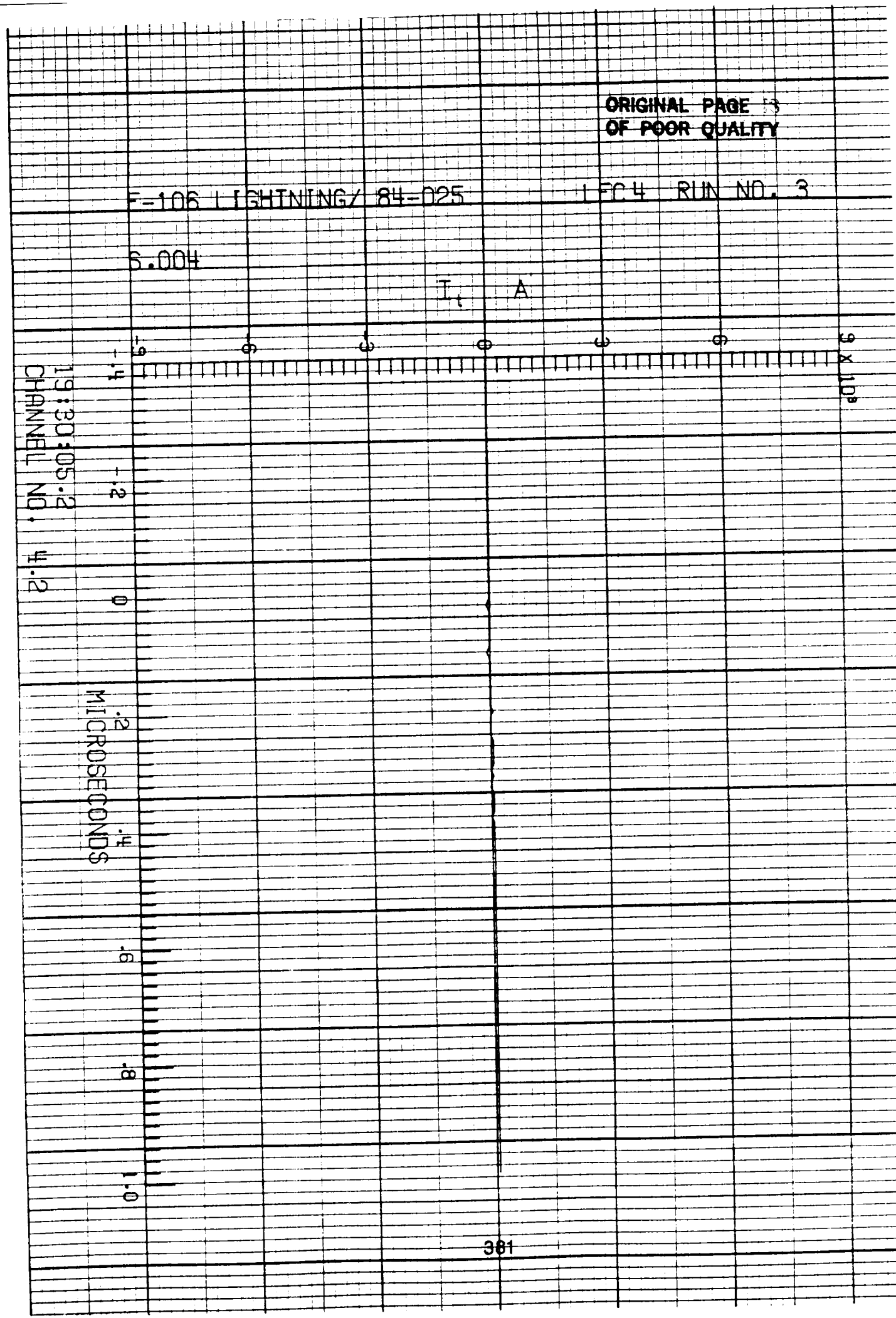

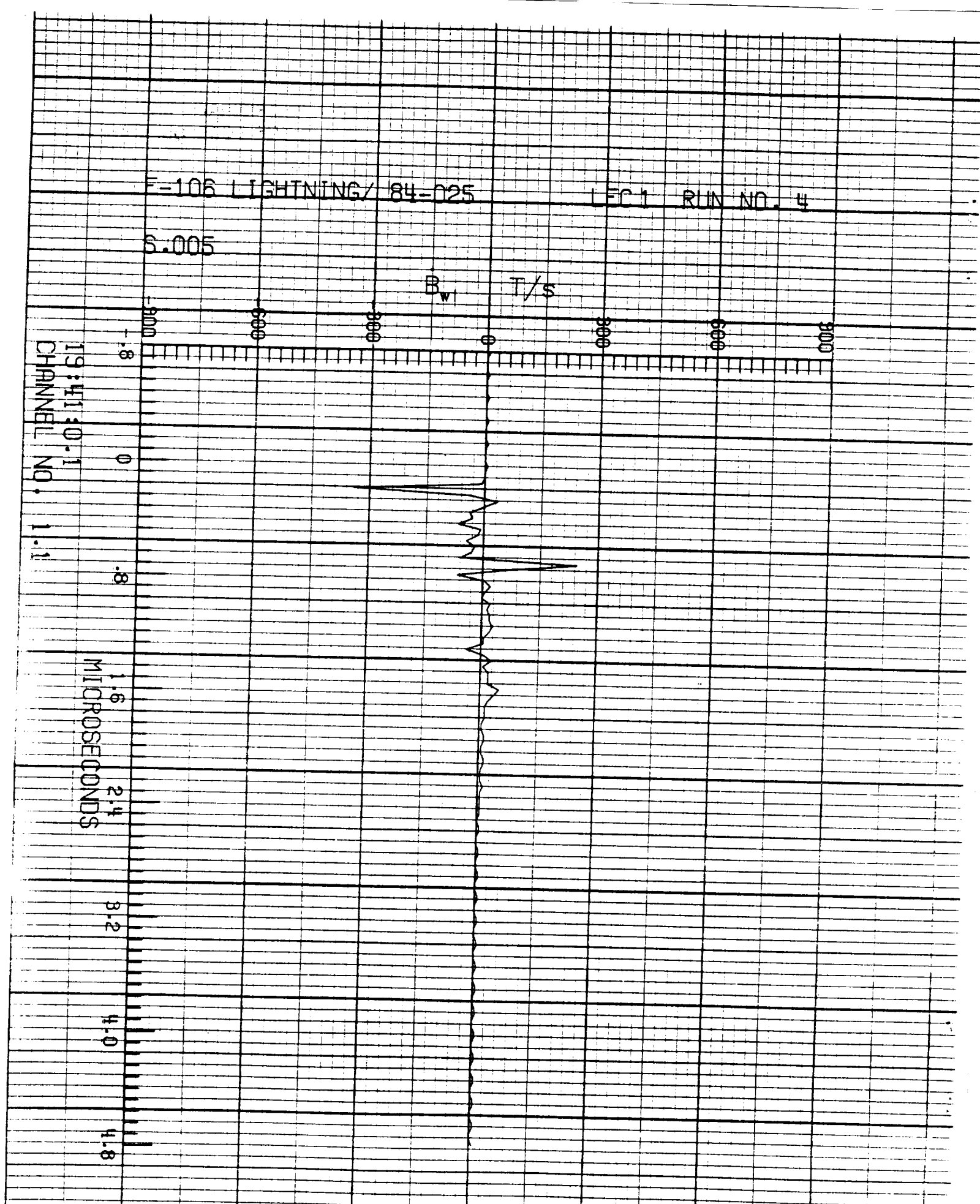
F-106 LIGHTNING/ 84-025
LEC 1 RUN NO. 4
S.005
B_{w1} T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:41:0.1
CHANNEL NO. 1.1

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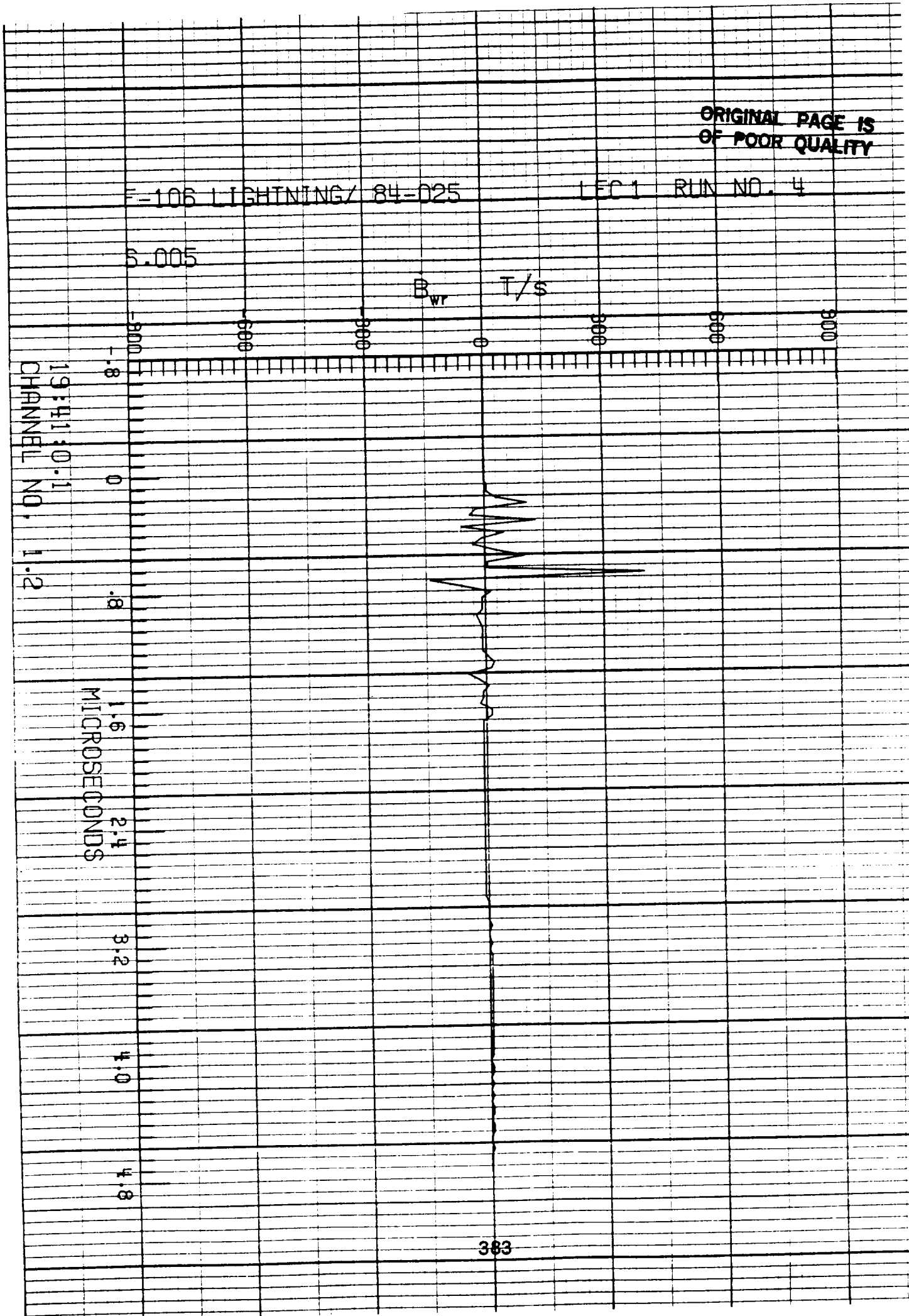

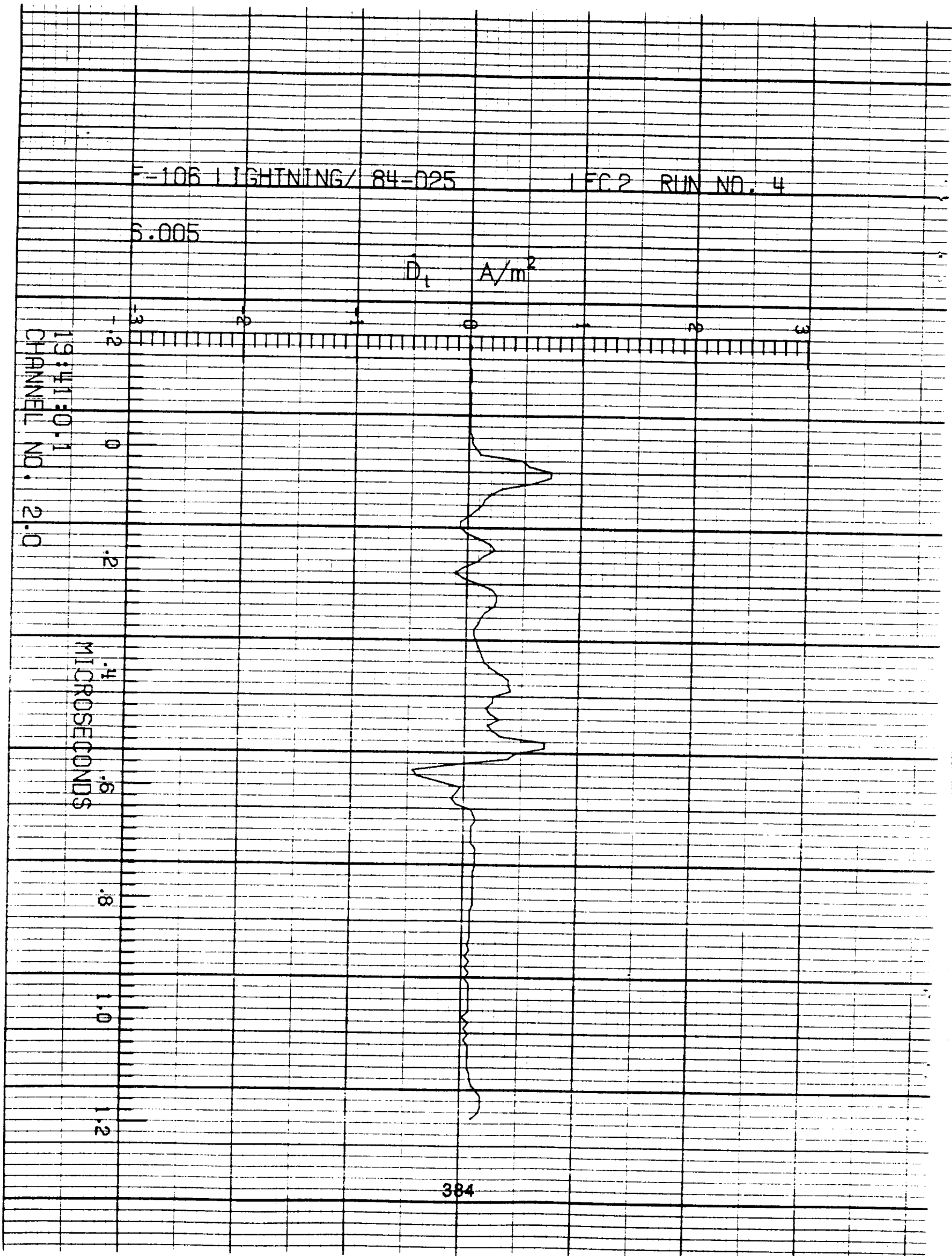
F-106 LIGHTNING/ 84-025
LFC 2 RUN NO. 4
6.005
D_t A/m^2
-3
-2
-1
0
1
2
3
-.2
0
.2
.4
.6
.8
1.0
1.2
19:41:0.1
CHANNEL NO. 2.0
MICROSECONDS

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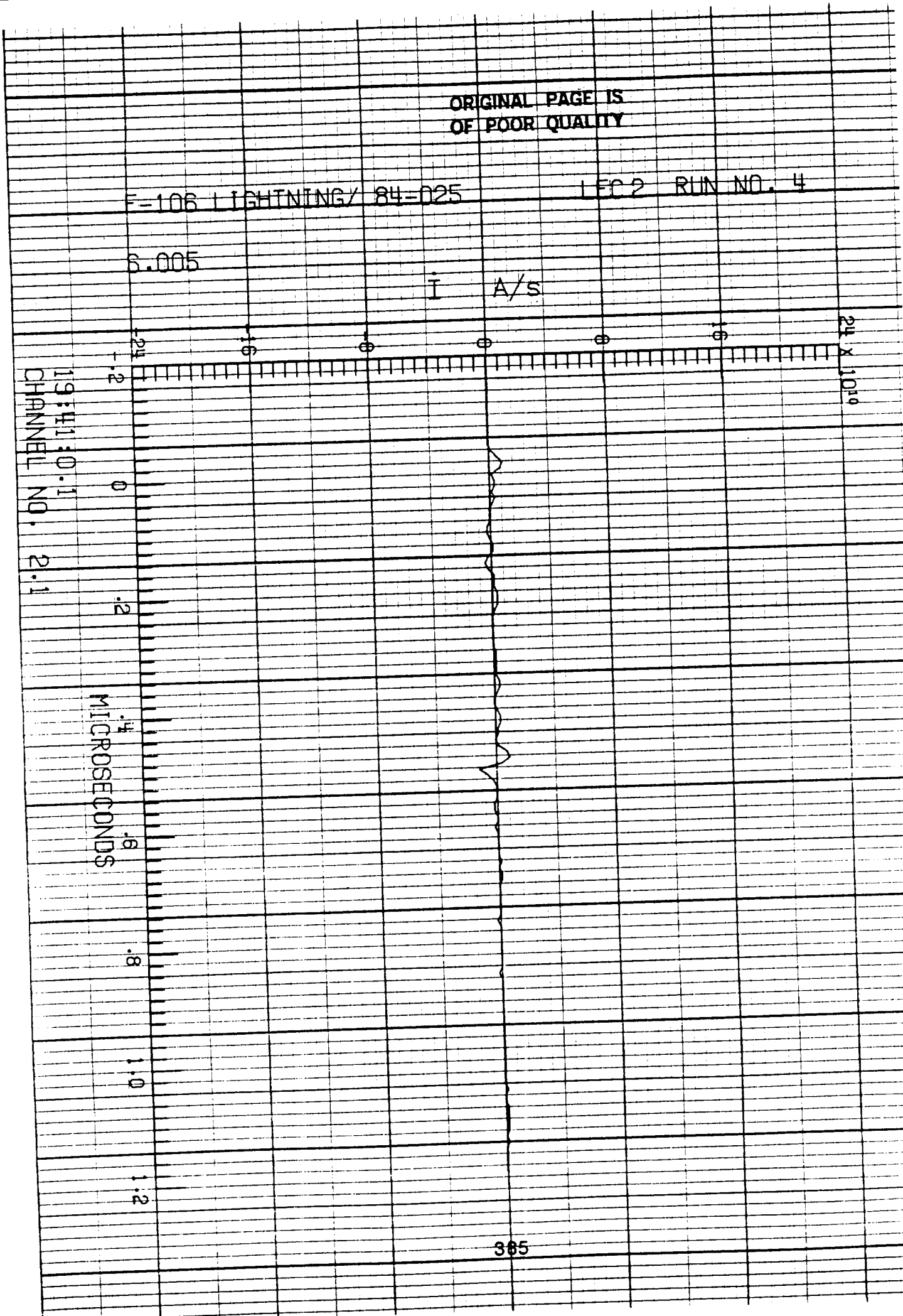

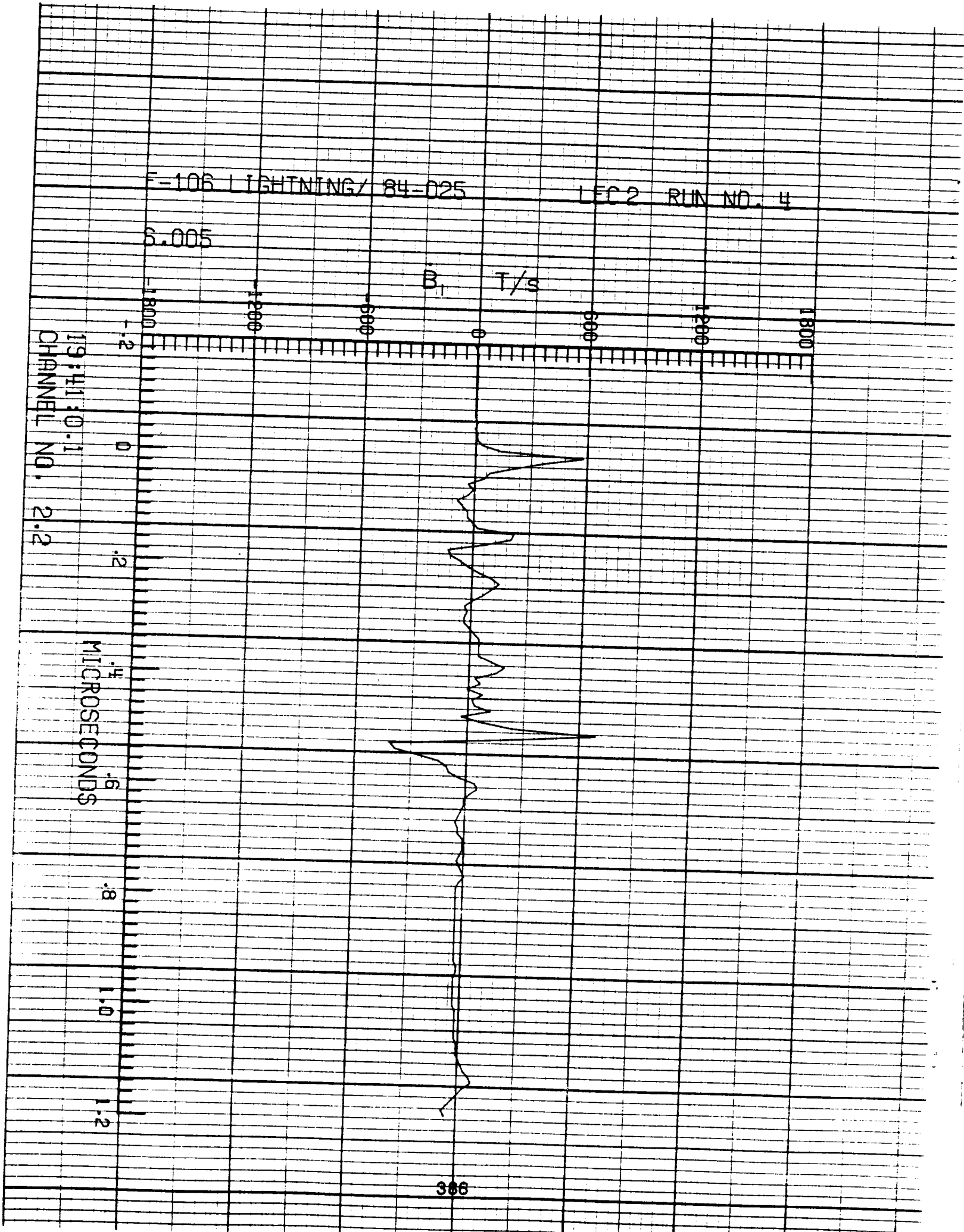
F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 4
6.005
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:41:0.1
CHANNEL NO. 2.2

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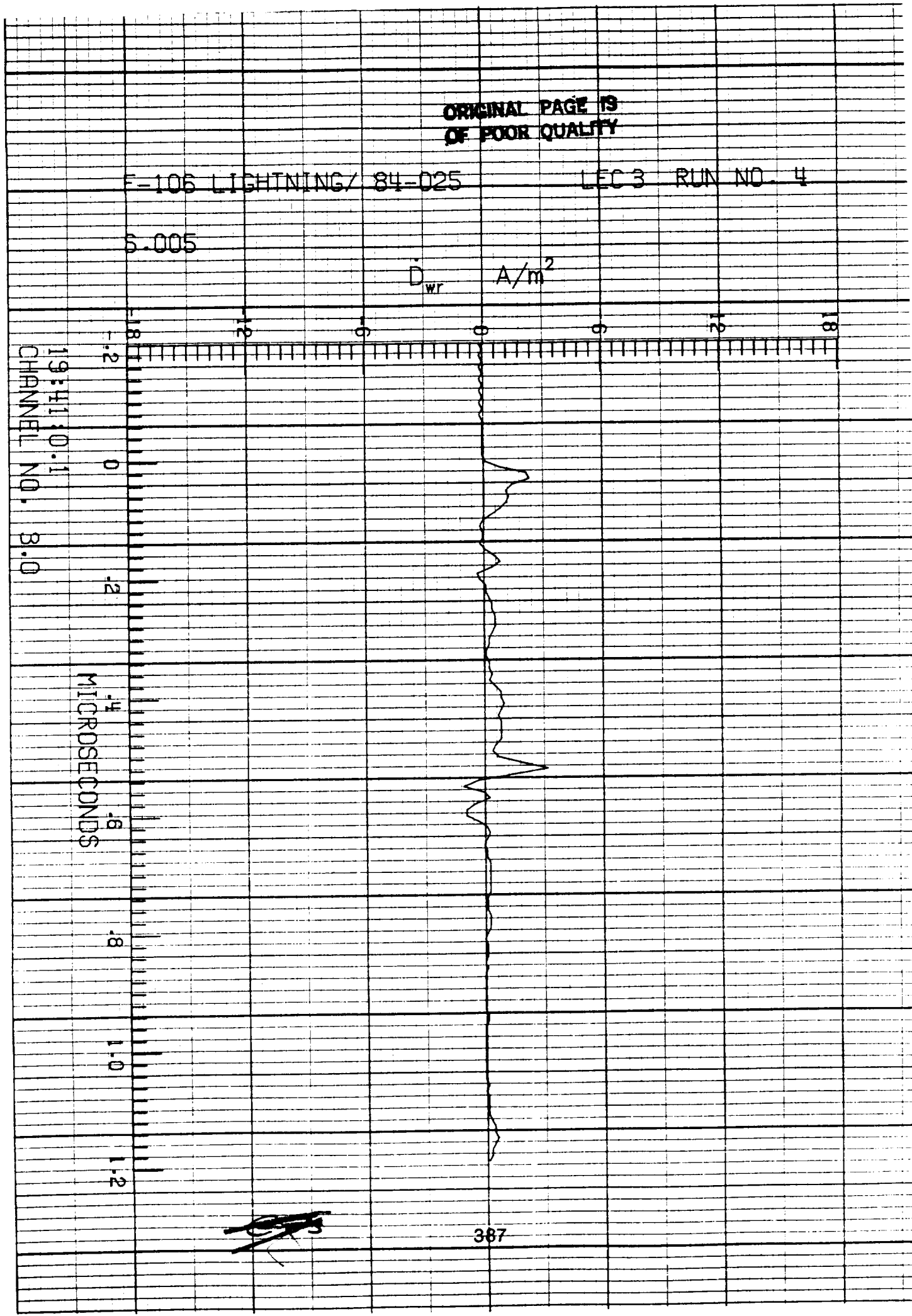

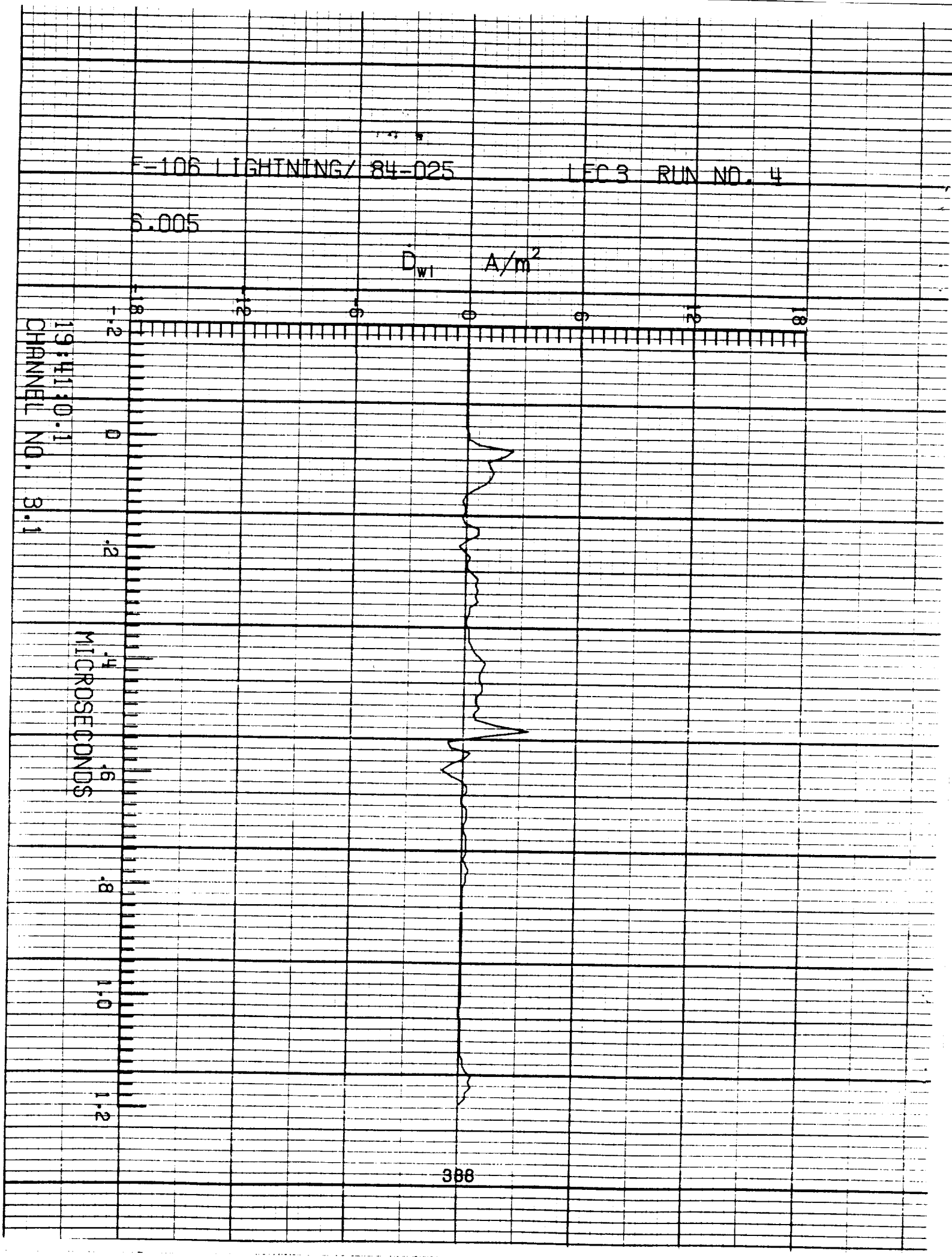
F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 4
6.005
$\dot{D}_{w1}$ A/m^2
-18
-12
-6
0
6
12
18
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:41:0.1
CHANNEL NO. 3.1

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F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 4

5.005

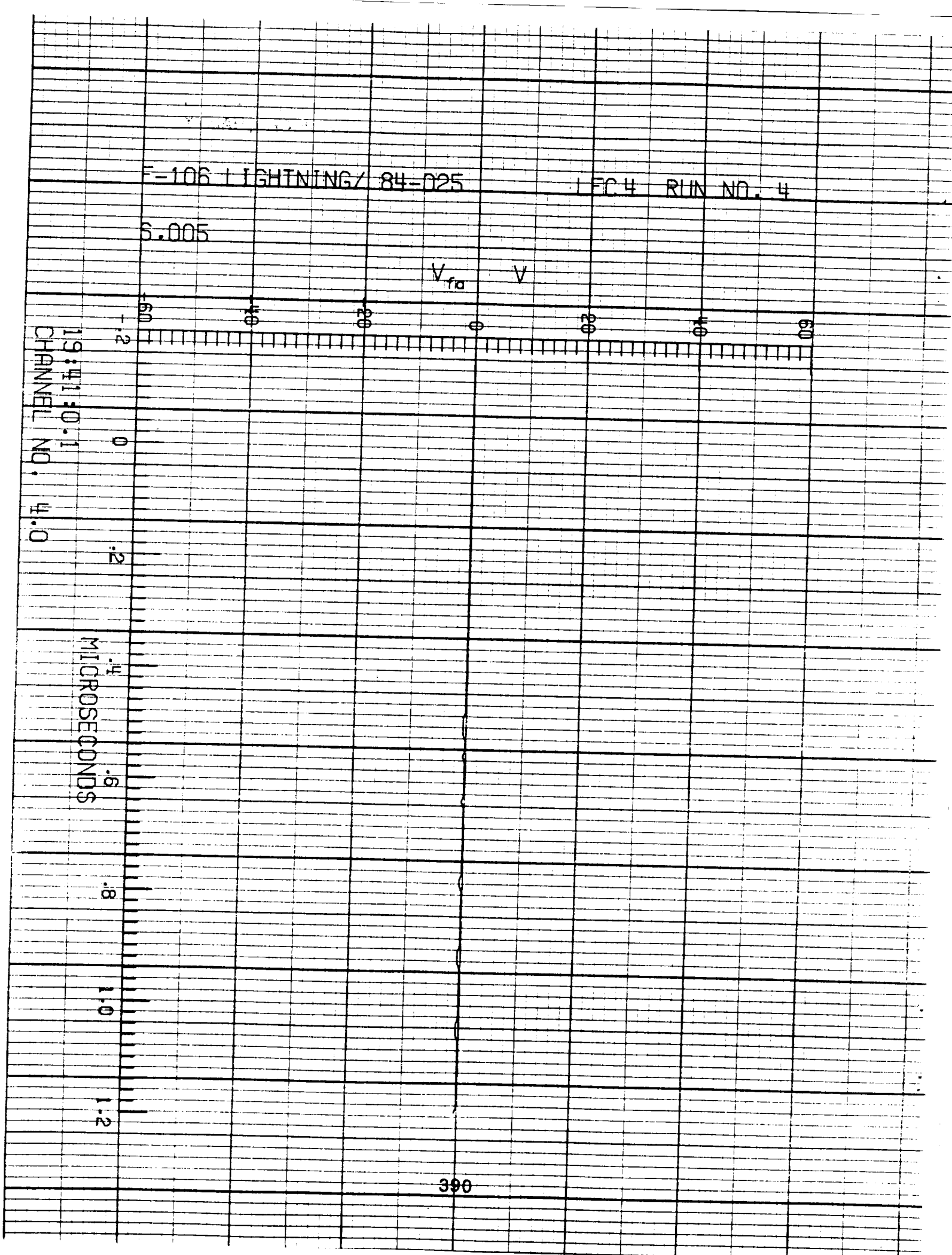
D_r A/m^2

-1.2 -.8 -.4 0 .4 .8 1.2

CHANNEL NO. 8.2 19:H1:0.1

-1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS


F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 4
S.005
V_{fa} V
-60
-40
-20
0
20
40
60
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:41:0.1
CHANNEL NO. 4.0

ORIGINAL PAGE IS
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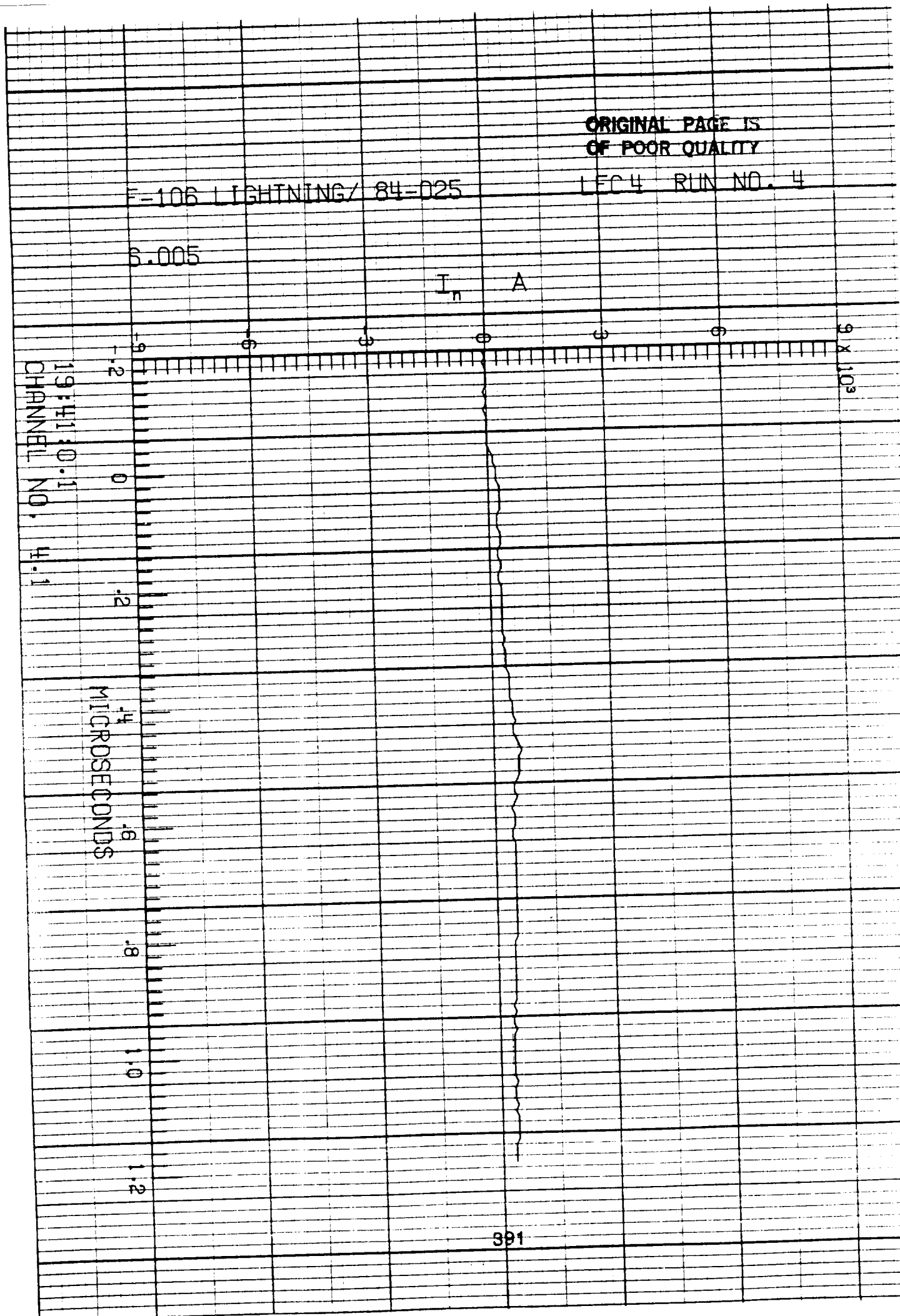

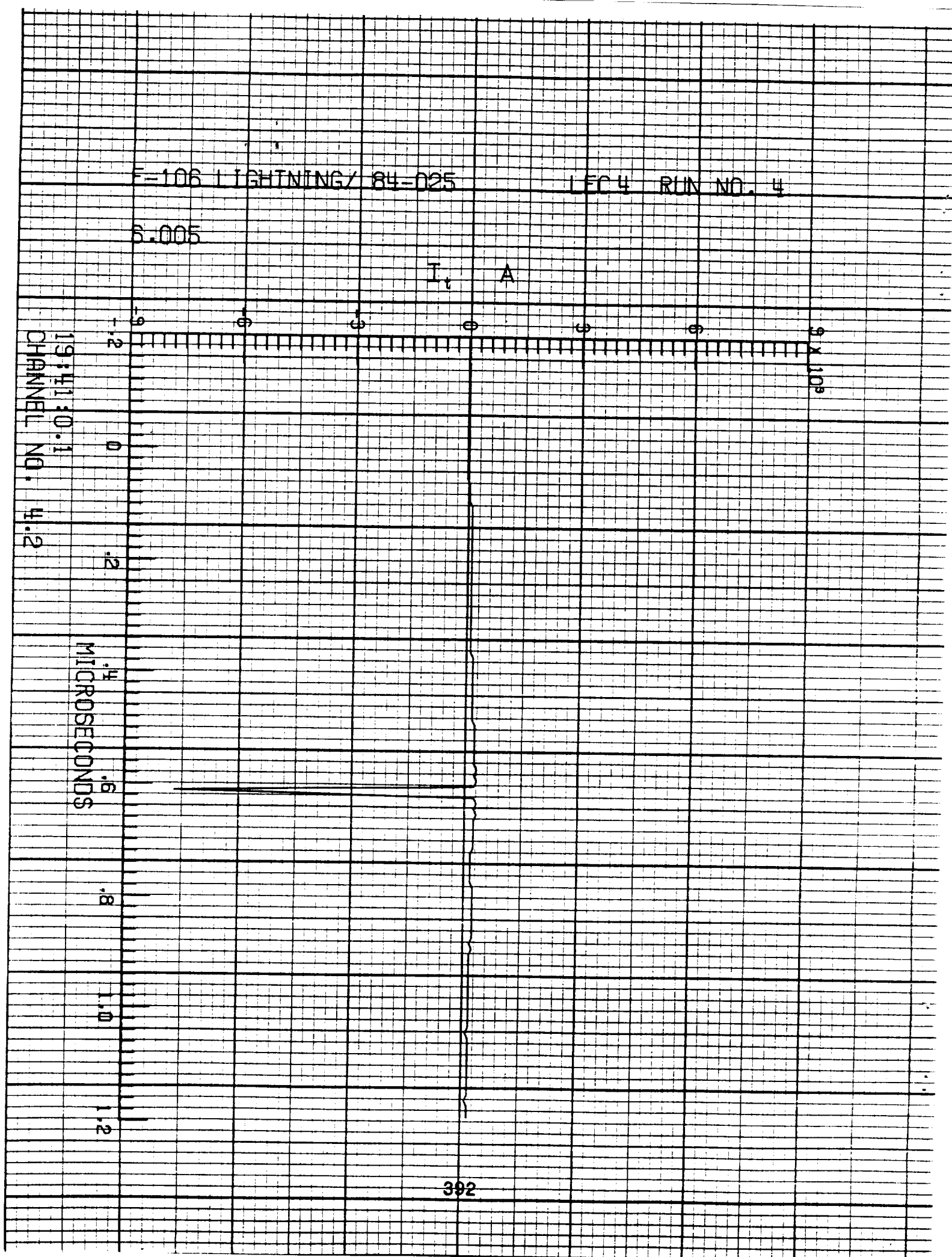
F-106 LIGHTNING/ 84-025
LEC 4 RUN NO. 4
6.005
I_t A
-9
-6
-3
0
3
6
9 x 10^3
-.2
0
.2
.4
.6
.8
1.0
1.2
MICROSECONDS
19:41:0.1
CHANNEL NO. 4.2

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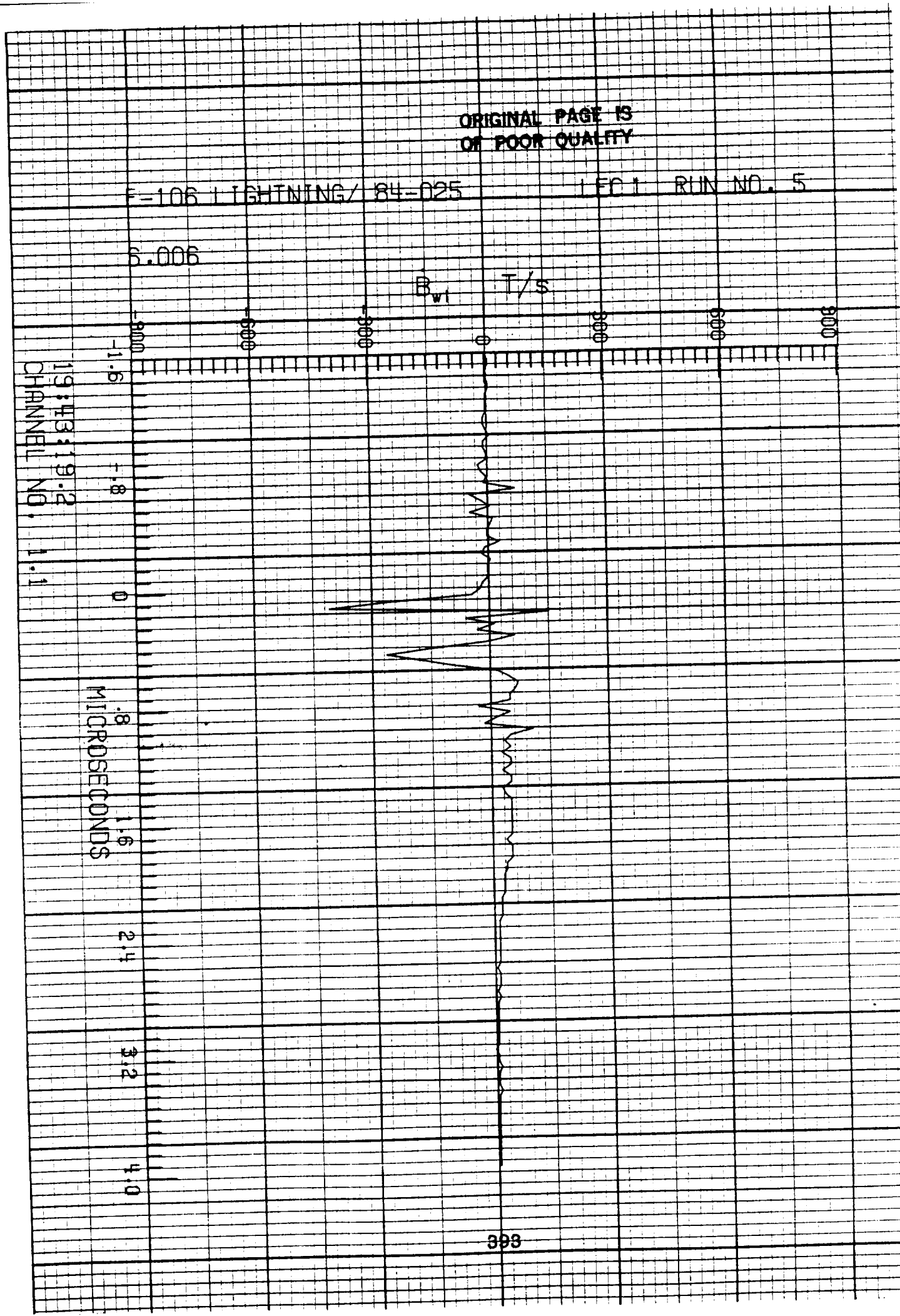

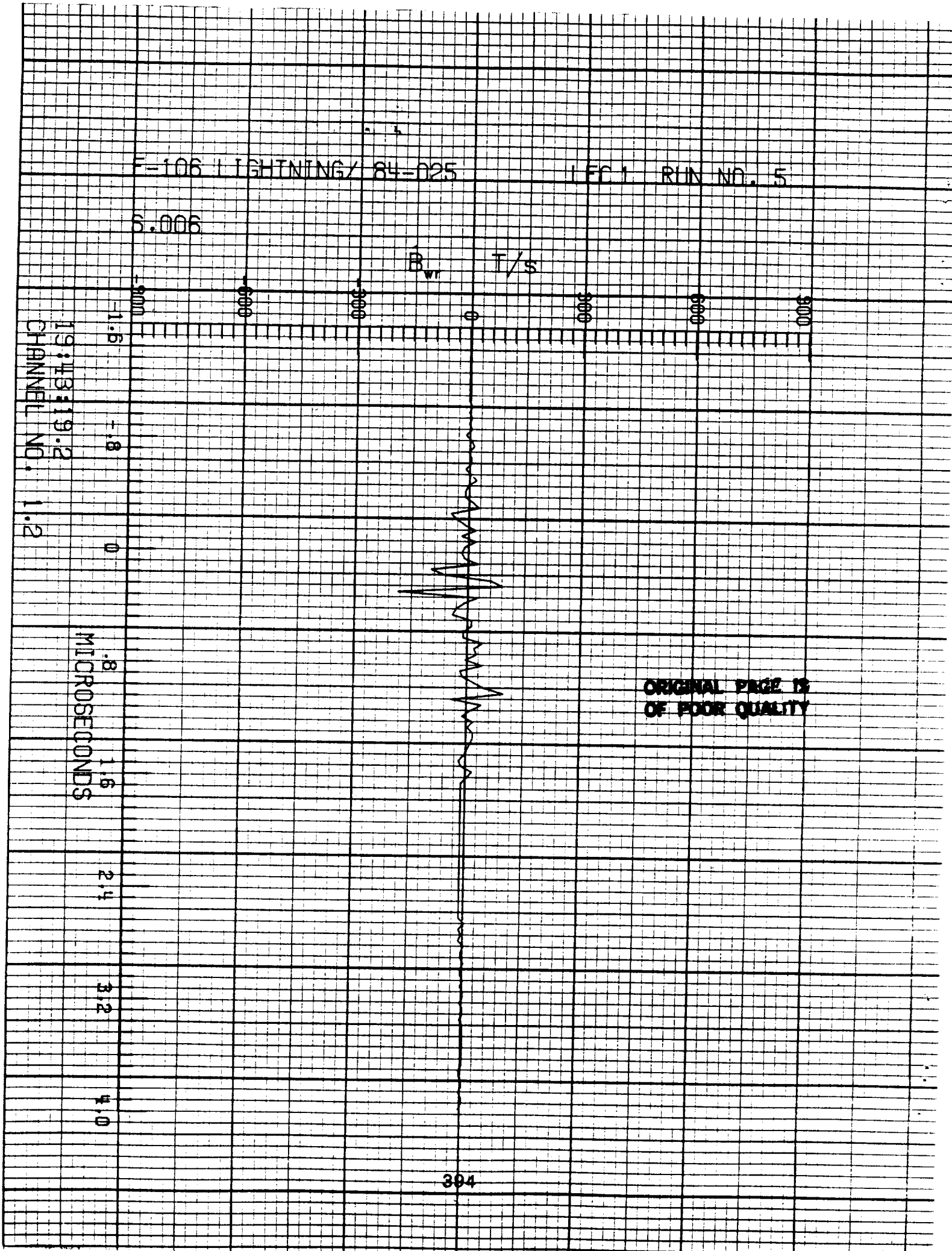

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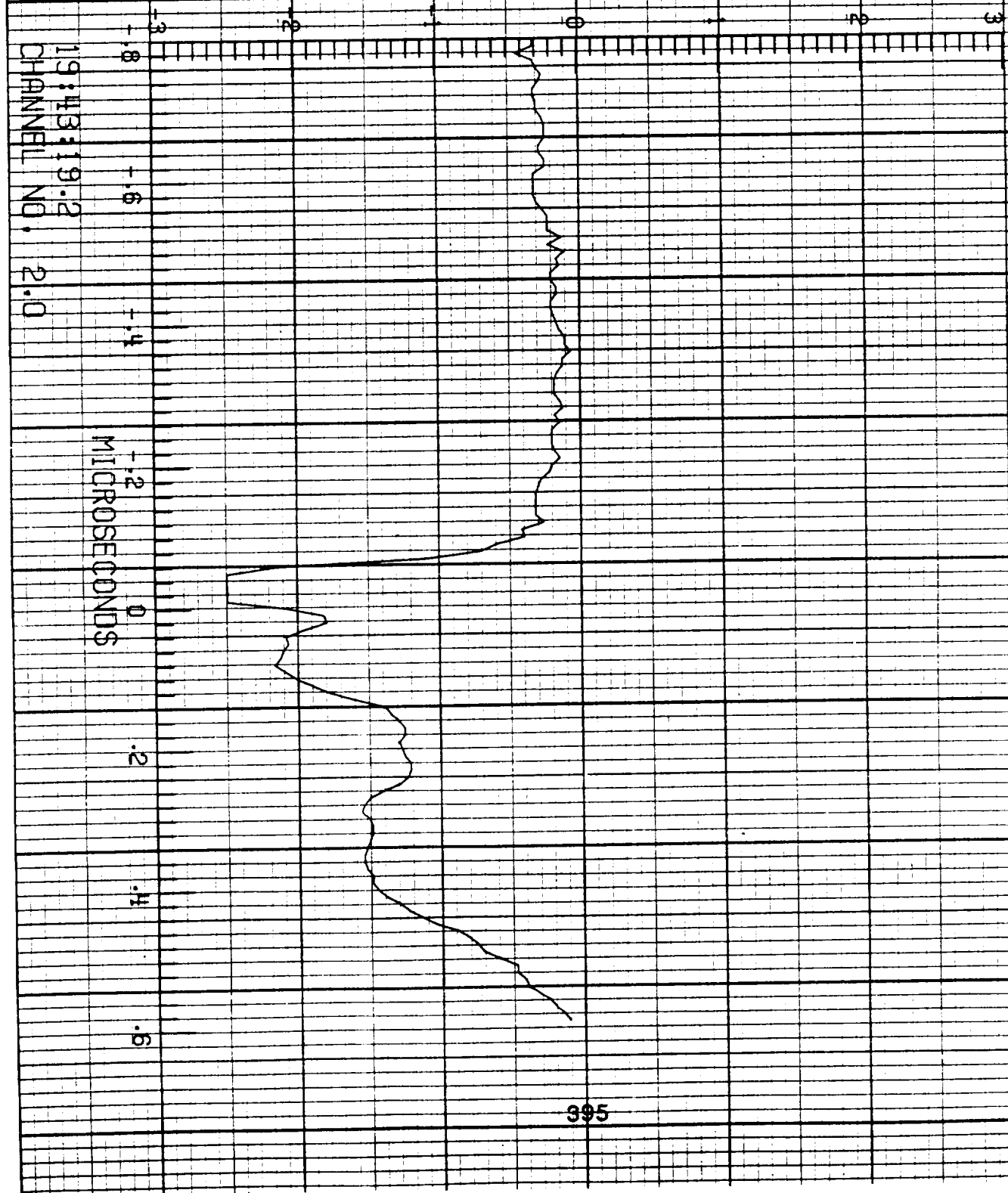
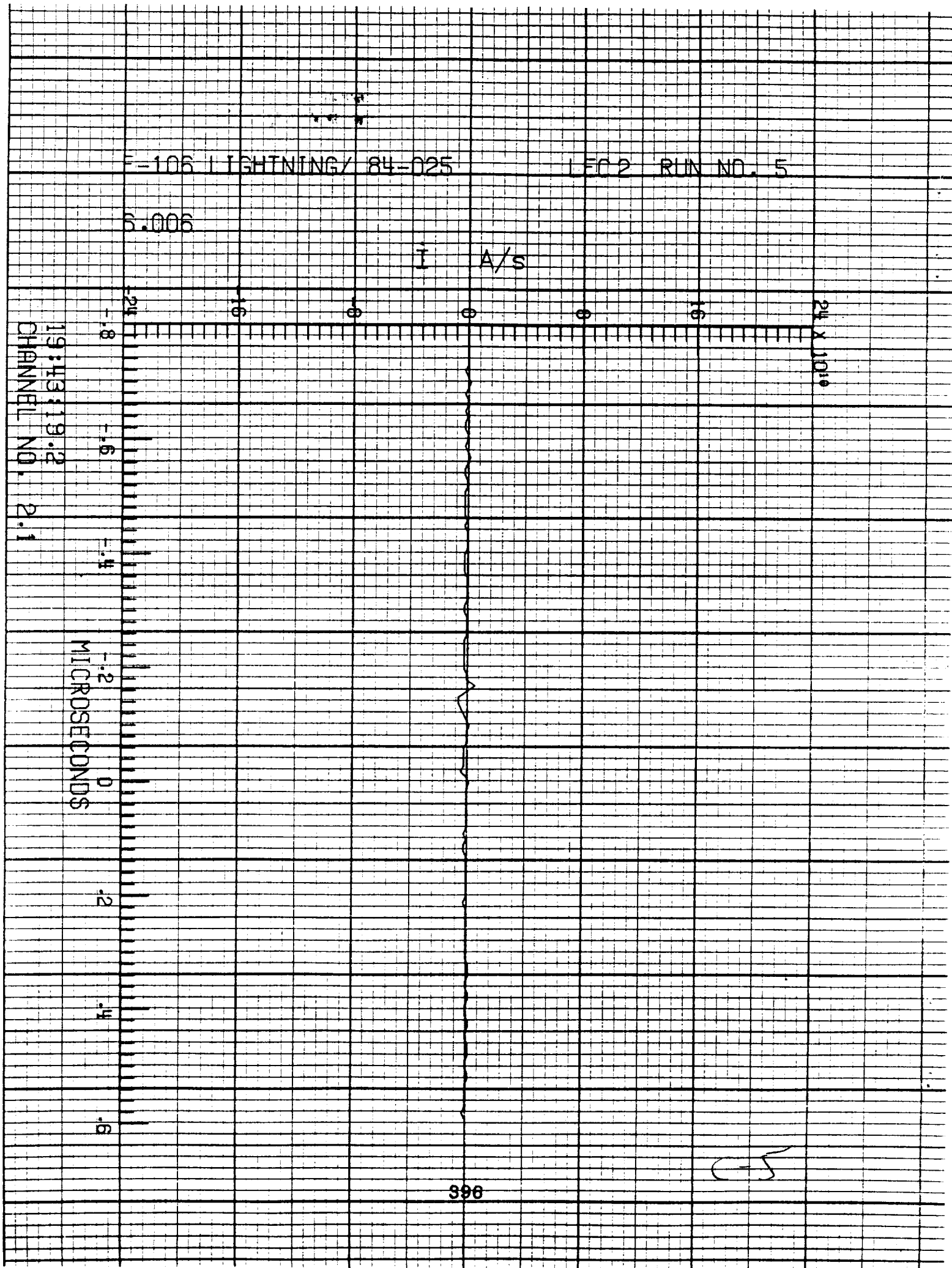
F=106 LIGHTNING/ 84-025 LFC2 RUN NO. 5

6.006

D_t A/m²




F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 5
6.006
I A/s
-24
-16
-8
0
8
16
24 x 10^10
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
19:43:19.2
CHANNEL NO. 2.1
C-5

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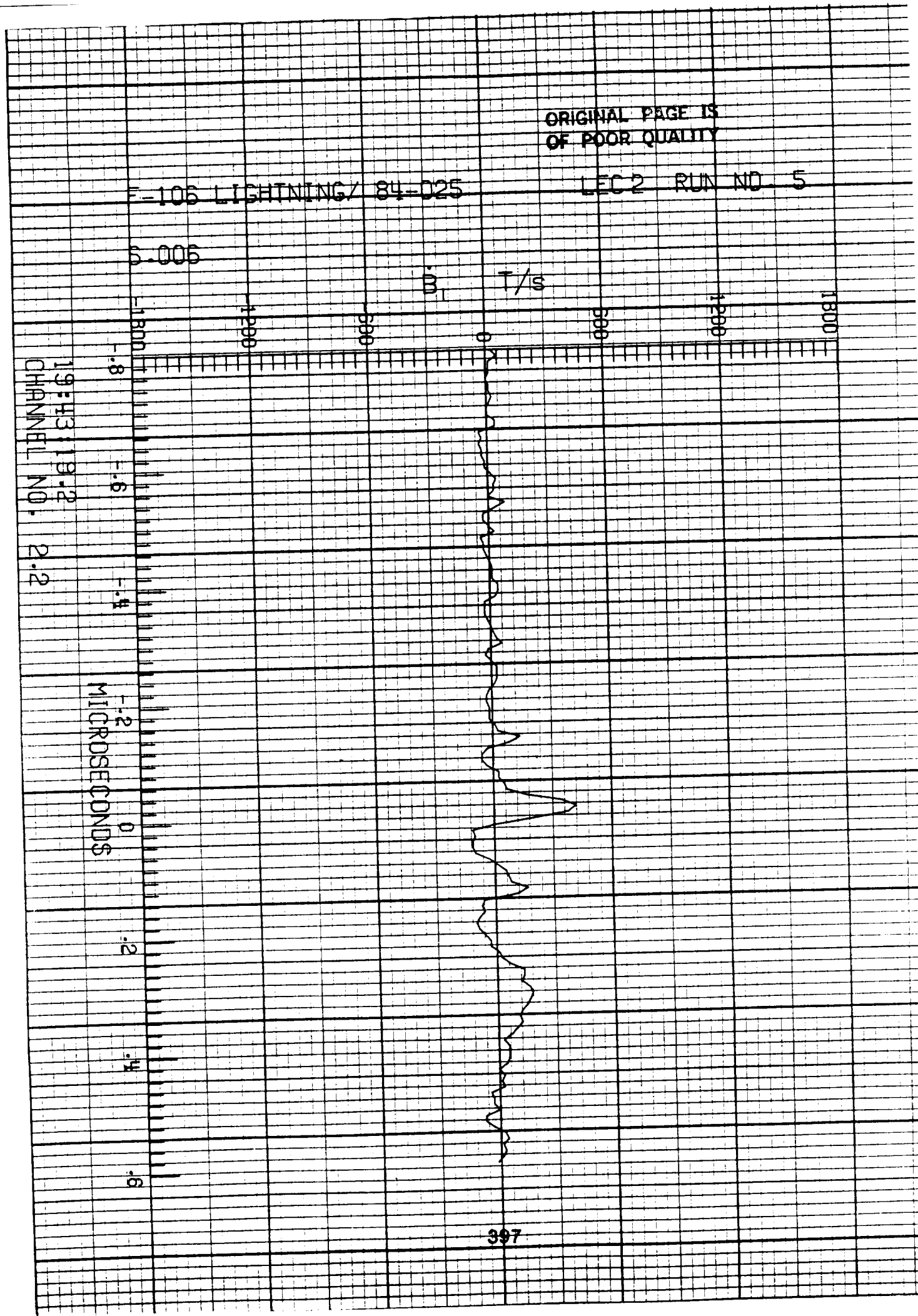
OF POOR QUALITY



F=106 LIGHTNING/ 84=025 LEC 3 RUN NO. 5

6.006

$\bar{D}_{wr}$ A/m^2

-.8 -.6 -.4 -.2 0 .2 .4 .6 .8

19:43:19.2
CHANNEL NO. 8.0

MICROSECONDS

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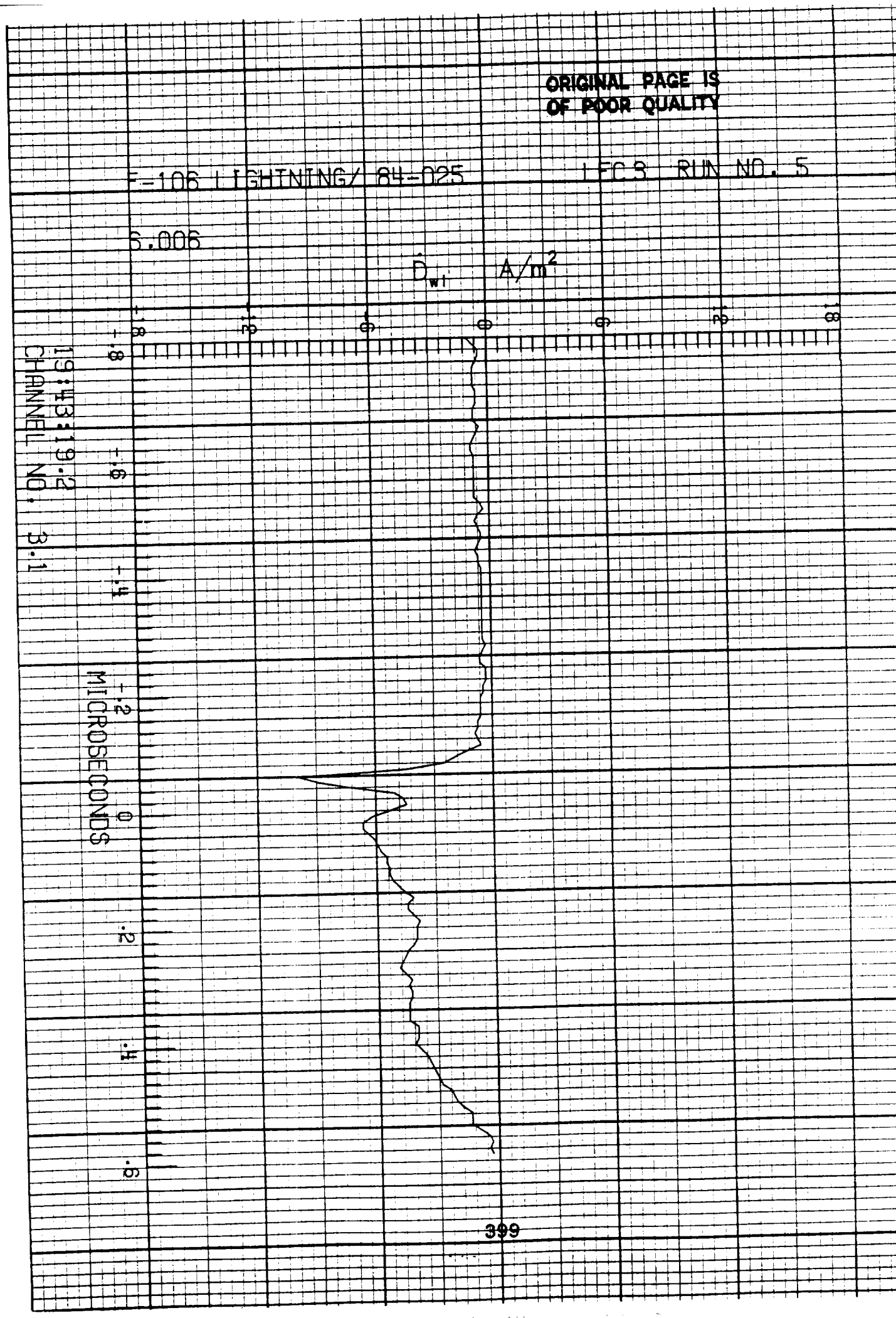

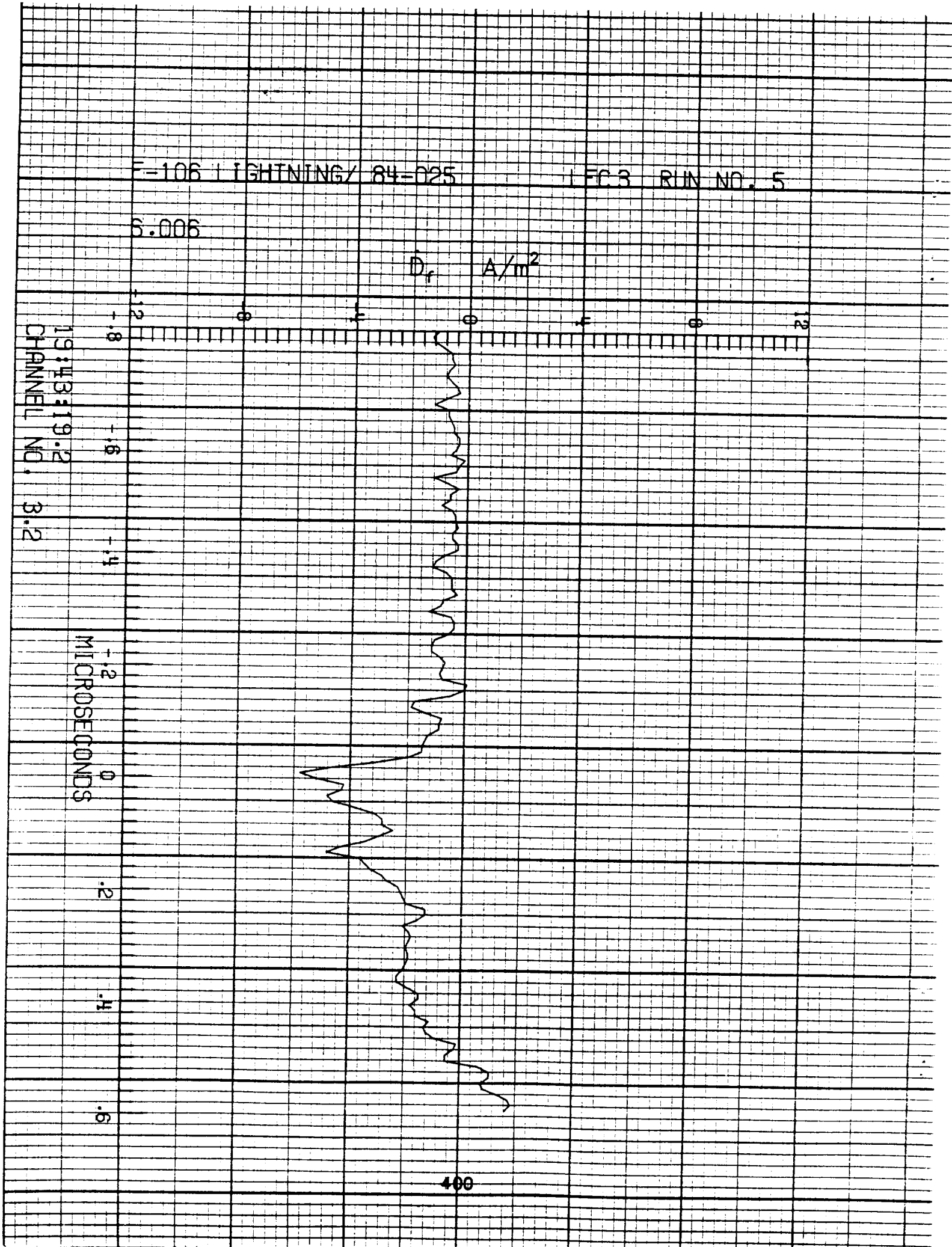
F-106 LIGHTNING/ 84-025
LFC3 RUN NO. 5
S.006
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
19:43:19.2
CHANNEL NO. 3.2

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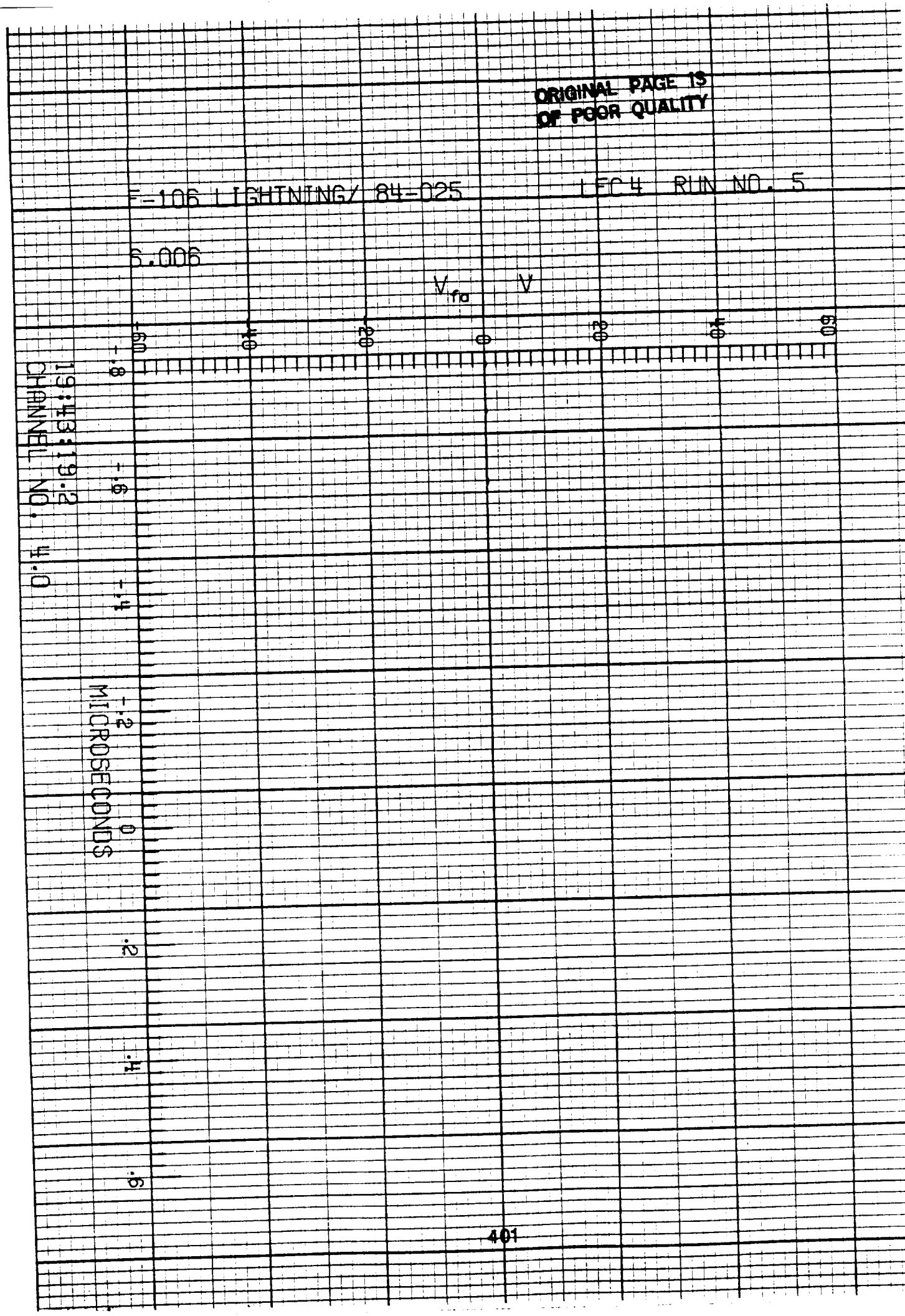

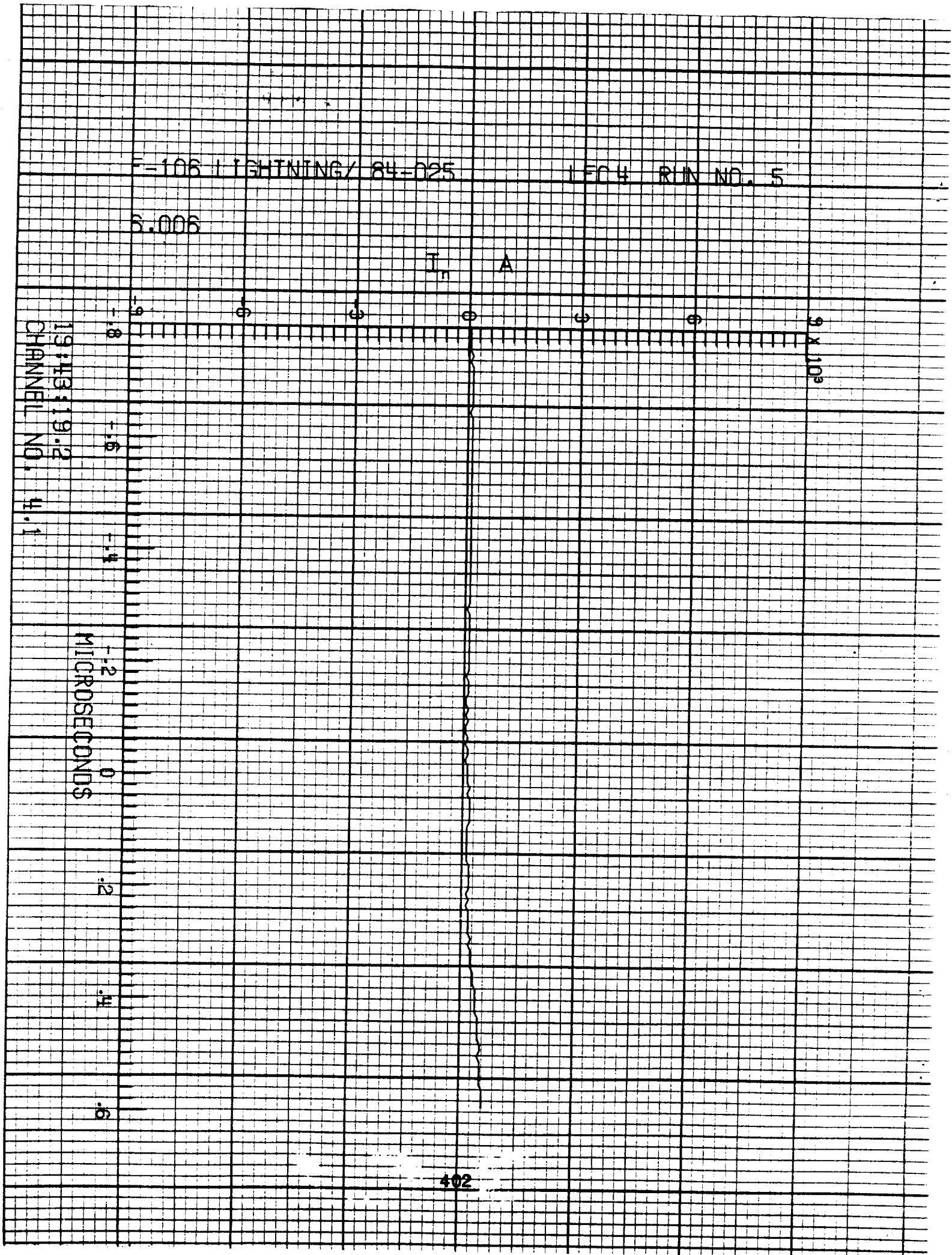
F-106 LIGHTNING/ 84-025
LEC4 RUN NO. 5
6.006
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
19:43:19.2
CHANNEL NO. 4.1

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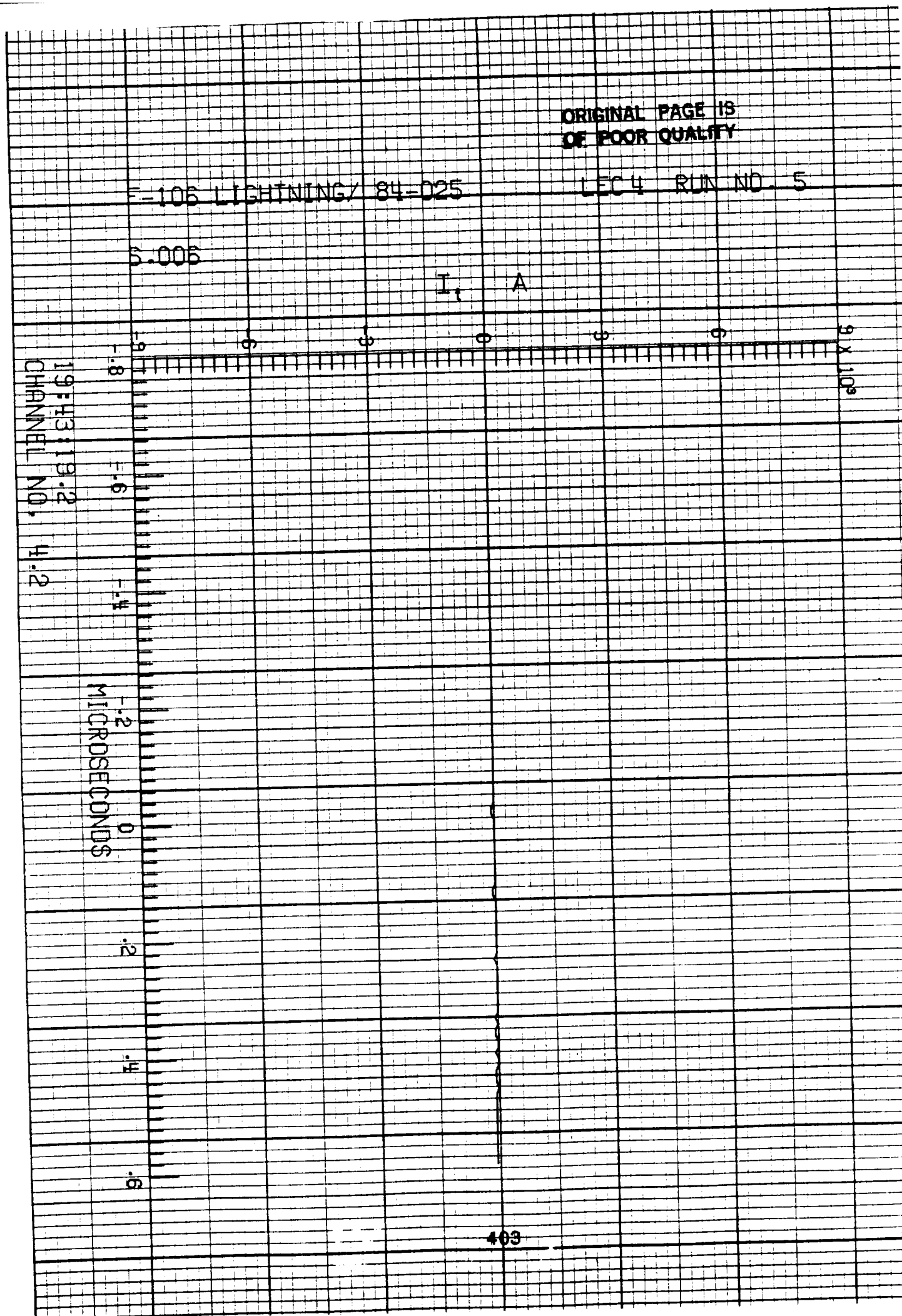

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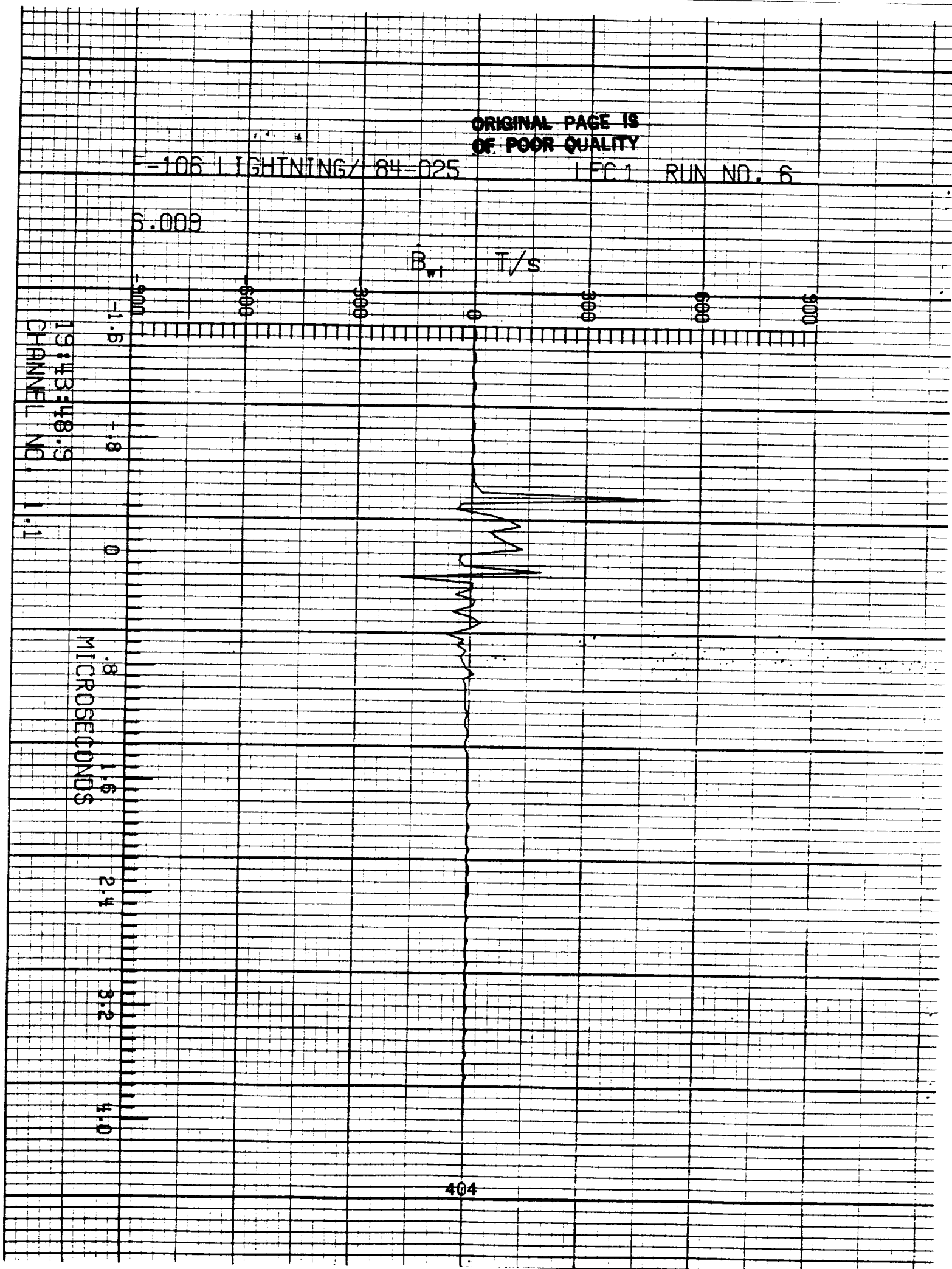

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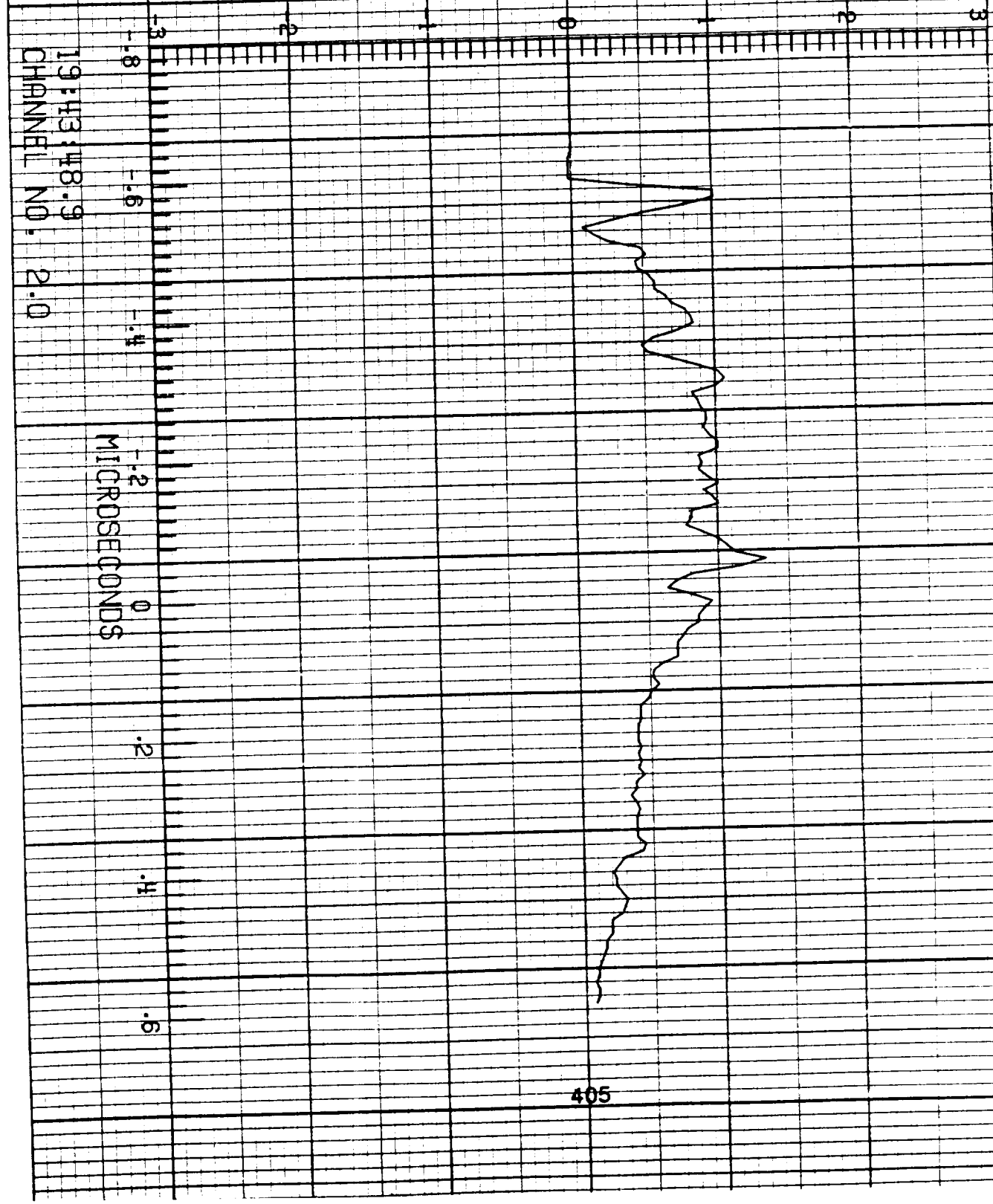
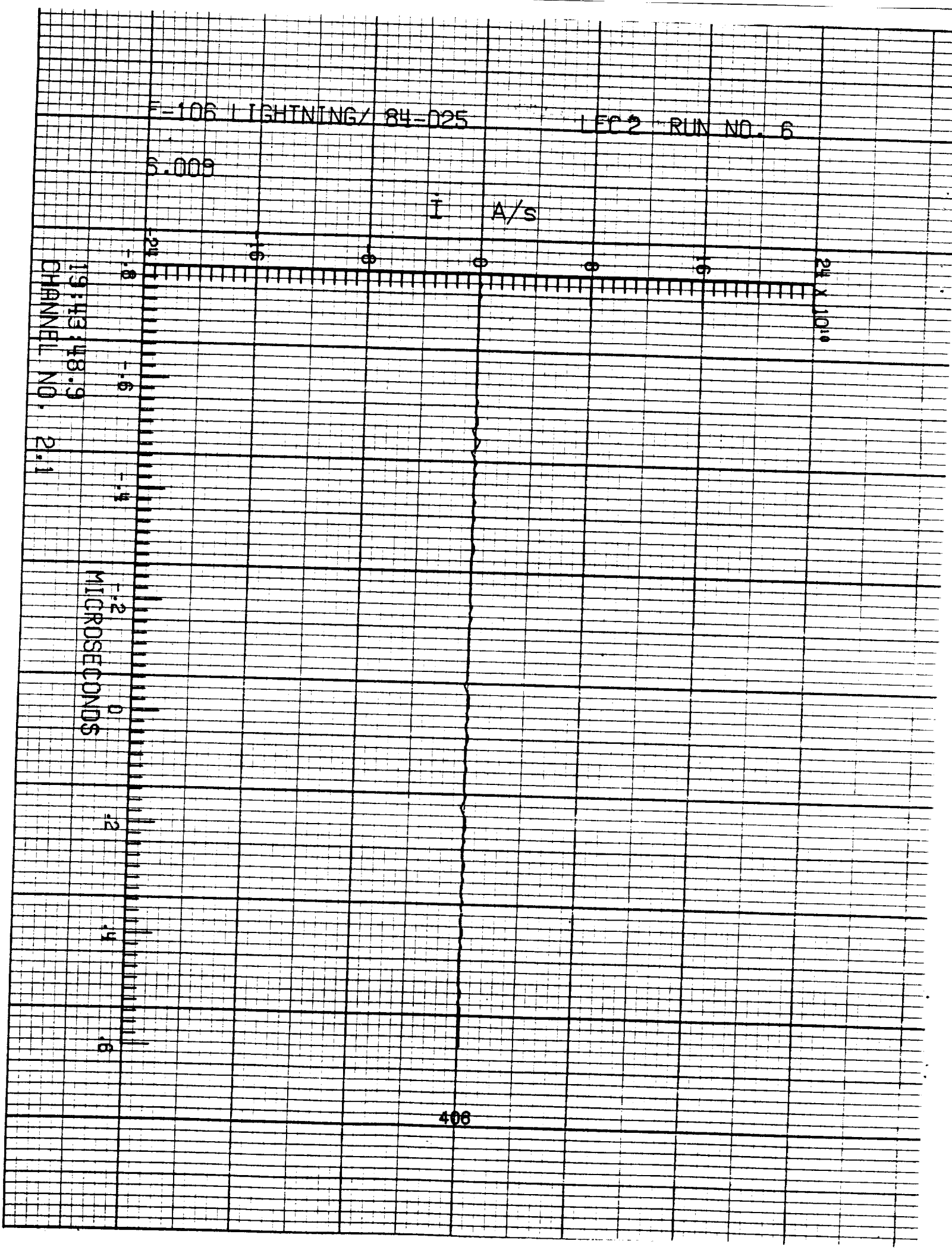
F-106 LIGHTNING/ 84-025 LEC 2 RUN NO. 6

6.009

D_t A/m^2




F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 6
6.009
İ A/s
-24
-16
-8
0
8
16
24 x 10^10
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS
19:43:48.9
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 6

S.009

$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-.8 -.6 -.4 -.2 0 .2 .4 .6

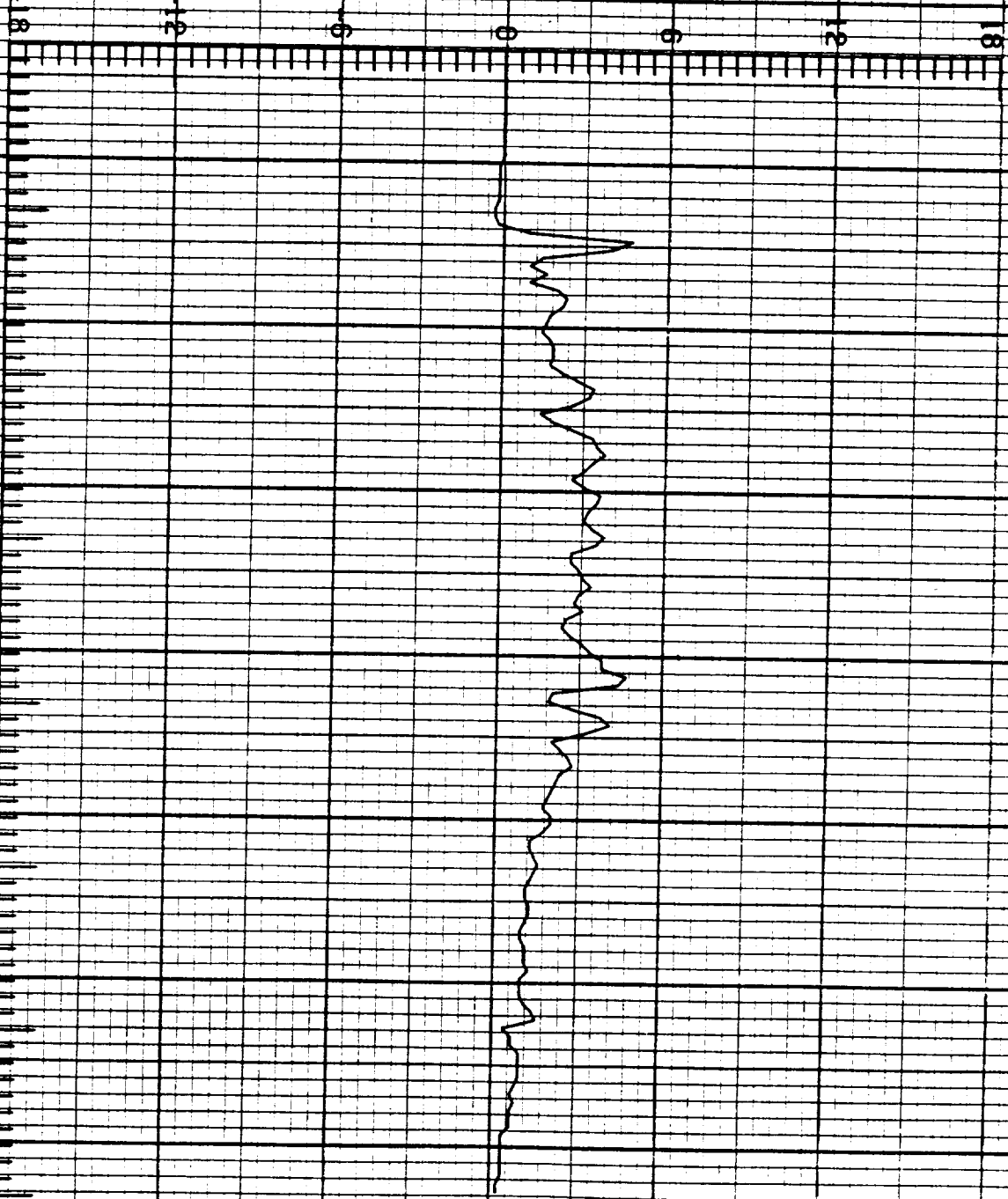
MICROSECONDS

19:43:48.9
CHANNEL NO. 8.0

F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 6

6.009

D_{wt} A/m^2



19:43:48.9
CHANNEL NO. 8.1

MICROSECONDS

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LEC 4 RUN NO. 6

5.009

V_{fa} V

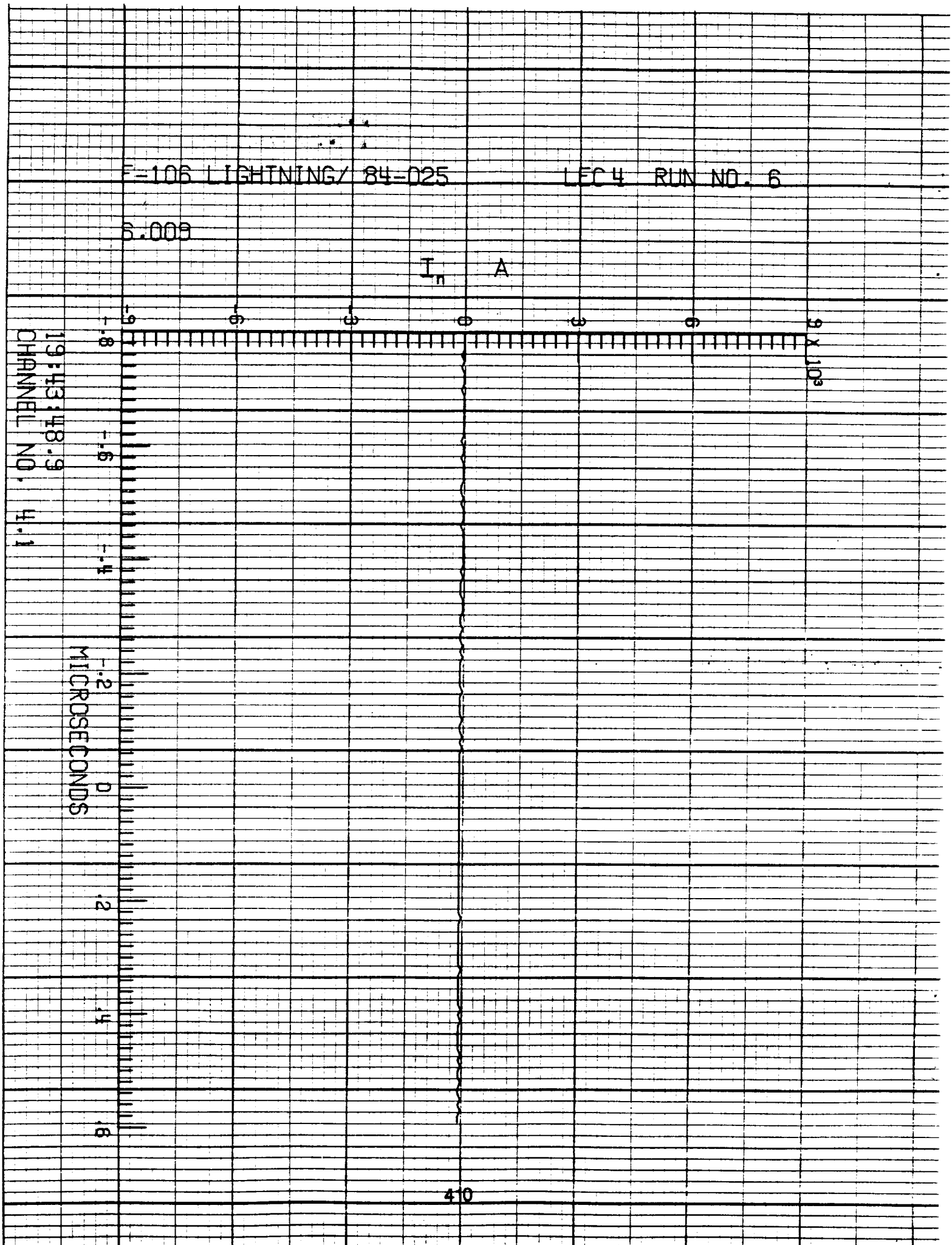
-50 -40 -20 0 20 40 60

-.8 -.6 -.4 -.2 0 .2 .4 .6 .8

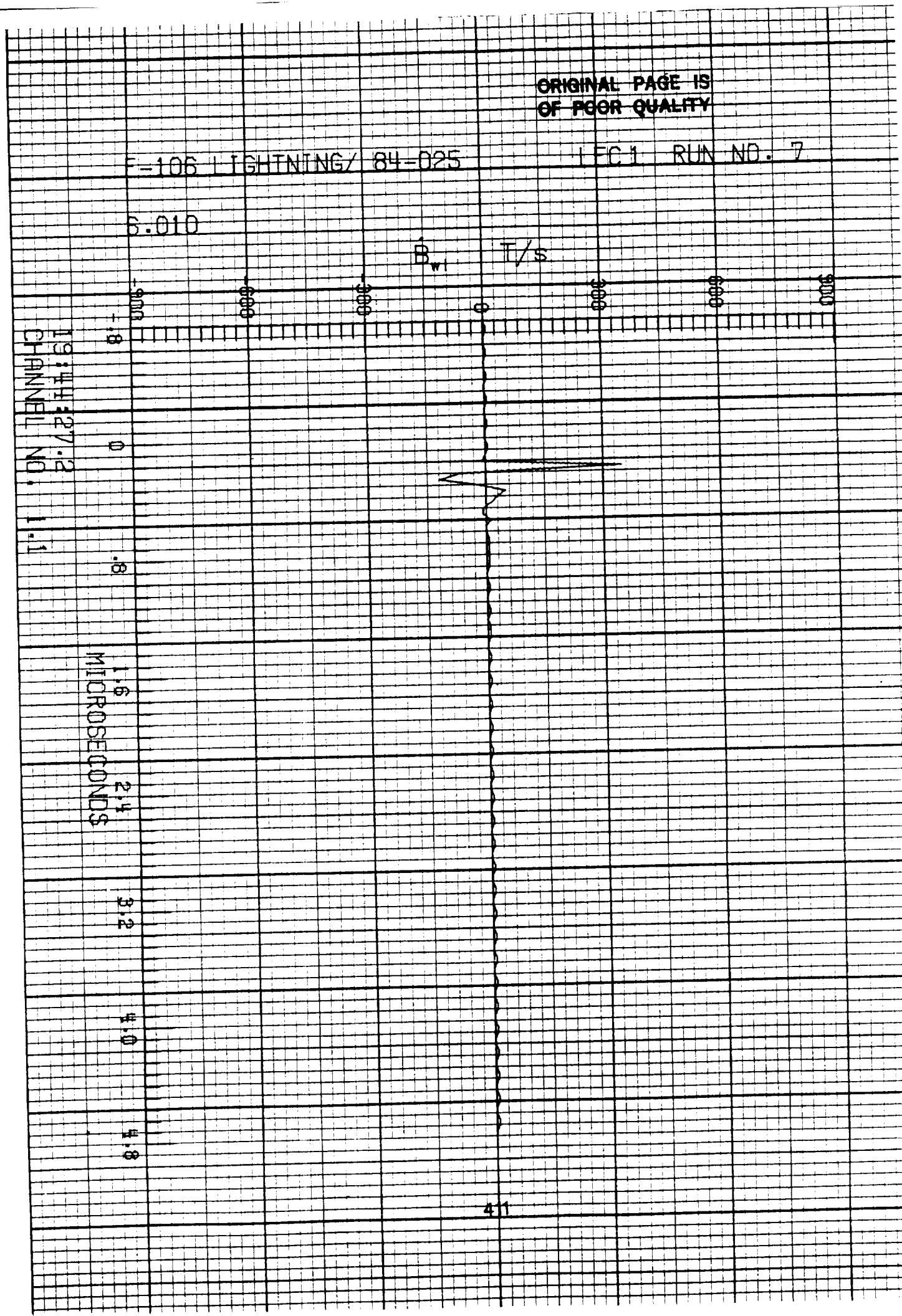
MICROSECONDS

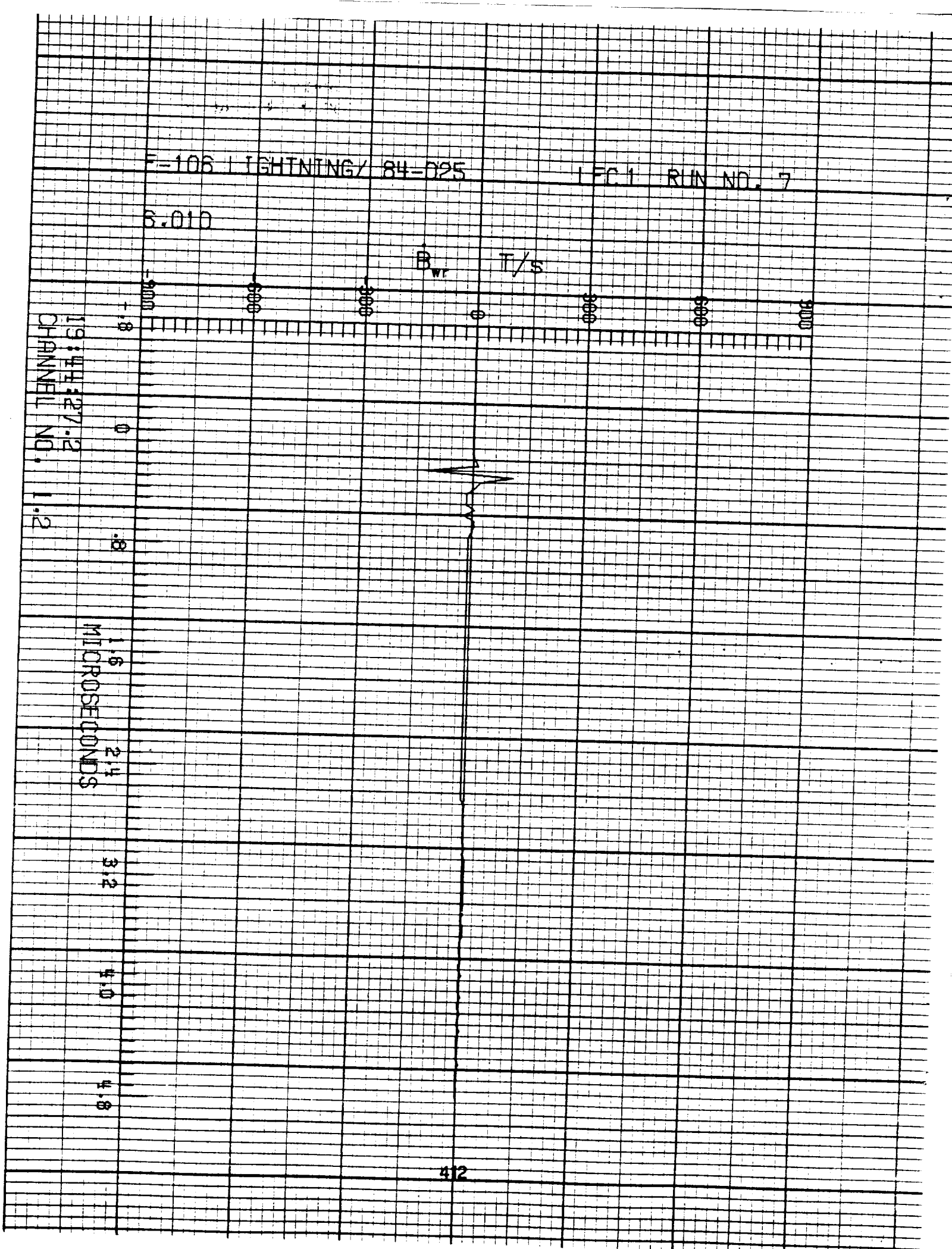
CHANNEL NO. H.O

19:43:48.6


F=106 LIGHTNING/ 84-025
LFC 4 RUN NO. 6
6.009
I_n A
-8
-6
-4
-2
0
2
4
6
8
x 10^3
CHANNEL NO. 4.1
19:43:48.9
-.8
-.6
-.4
-.2
0
.2
.4
.6
MICROSECONDS

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-025
LFC1 RUN NO. 7
6.010
$\dot{B}_{wr}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:44:27.2
CHANNEL NO. 1.2

ORIGINAL PAGE IS
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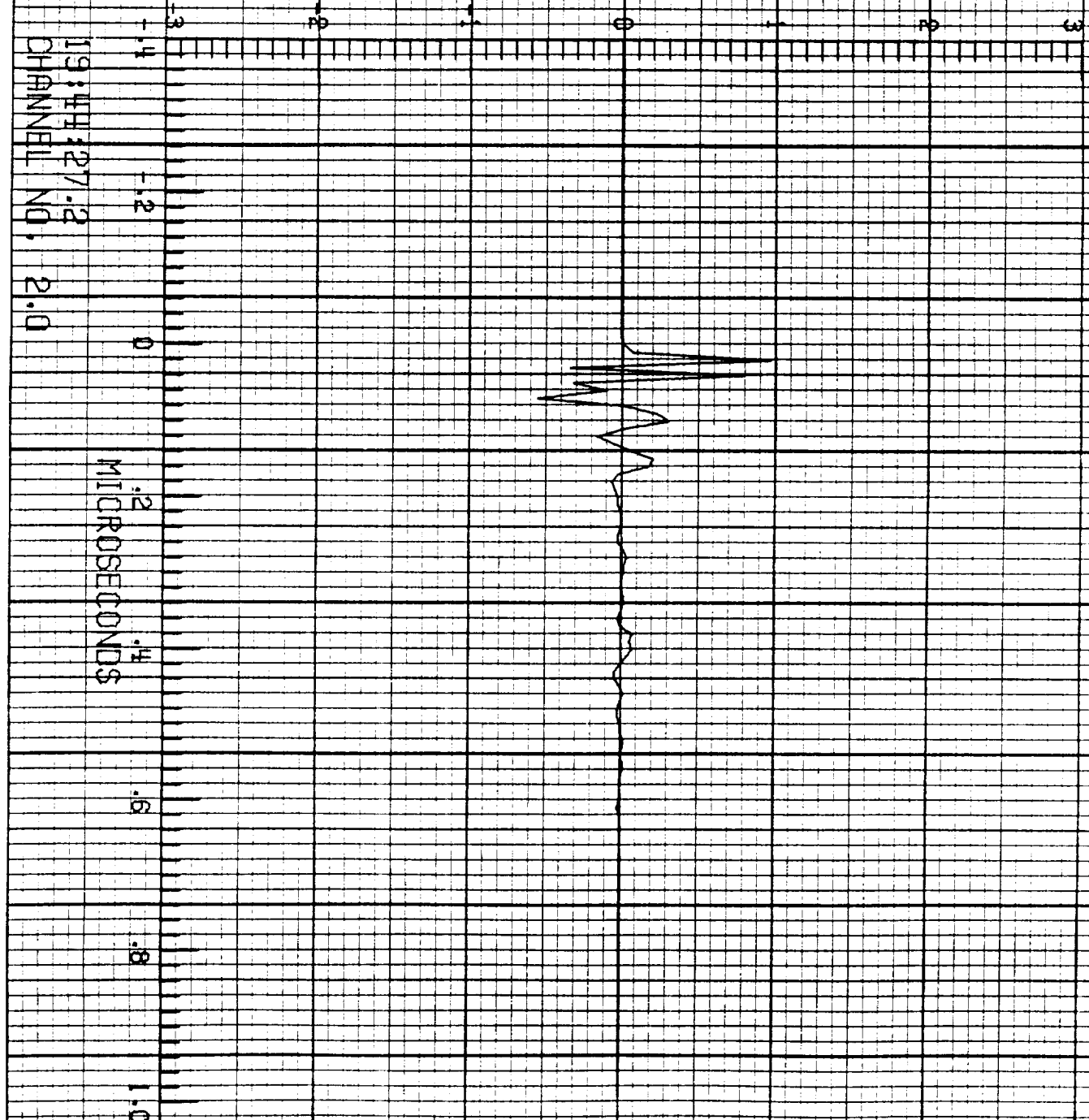
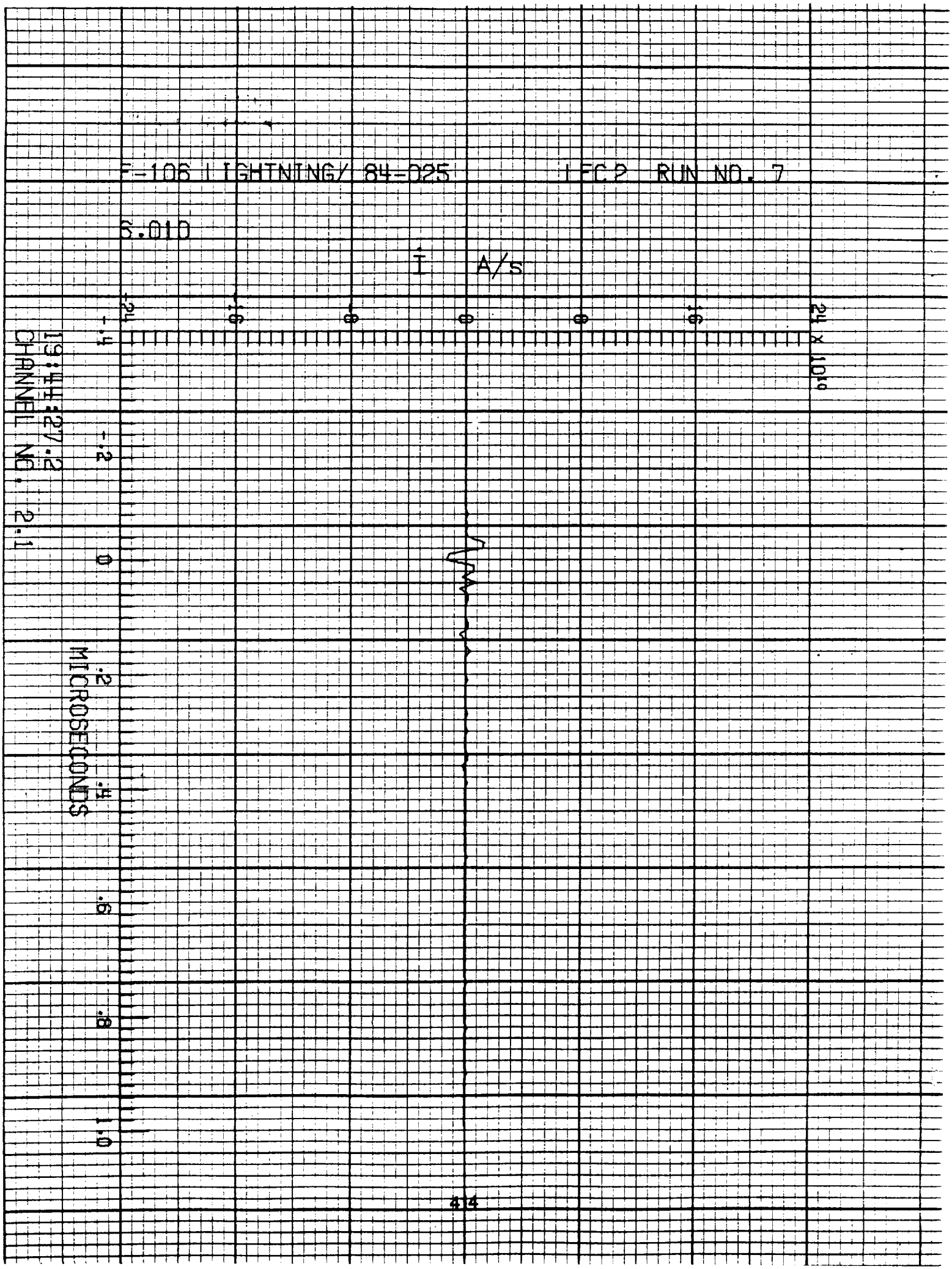
F-106 LIGHTNING/ 84-025 IFC.2 RUN NO. 7

6.010

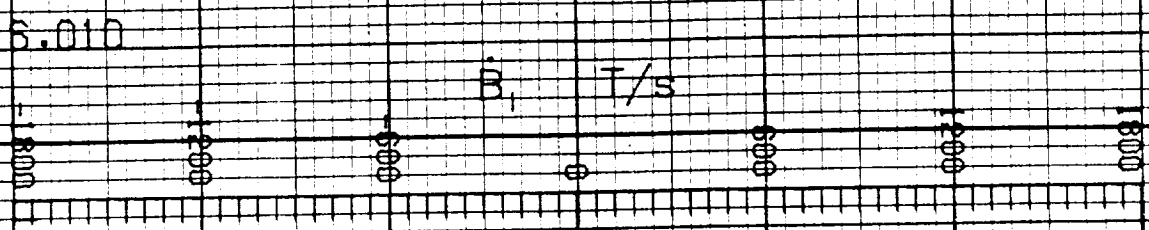
$\dot{D}_t$ A/m^2

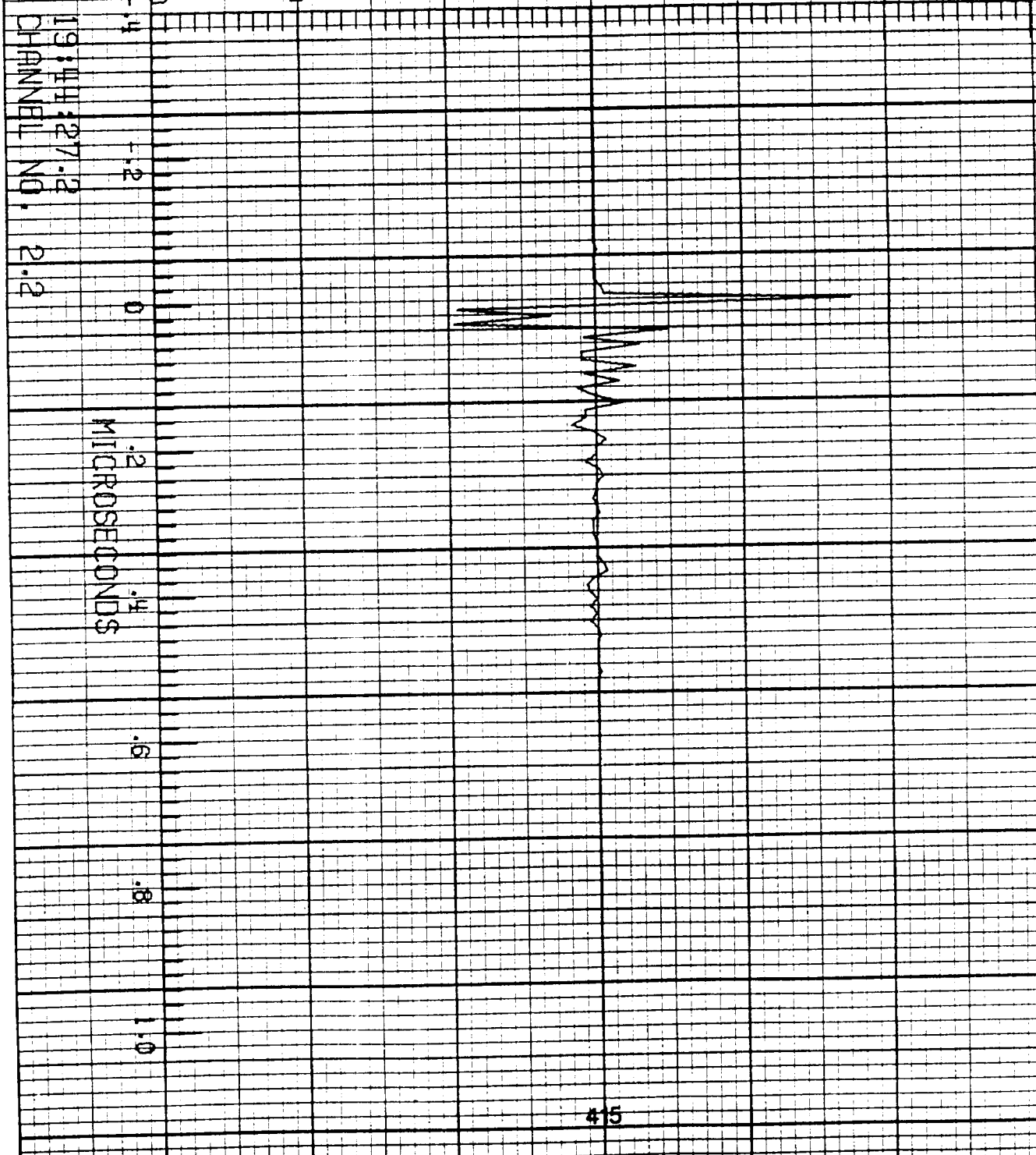


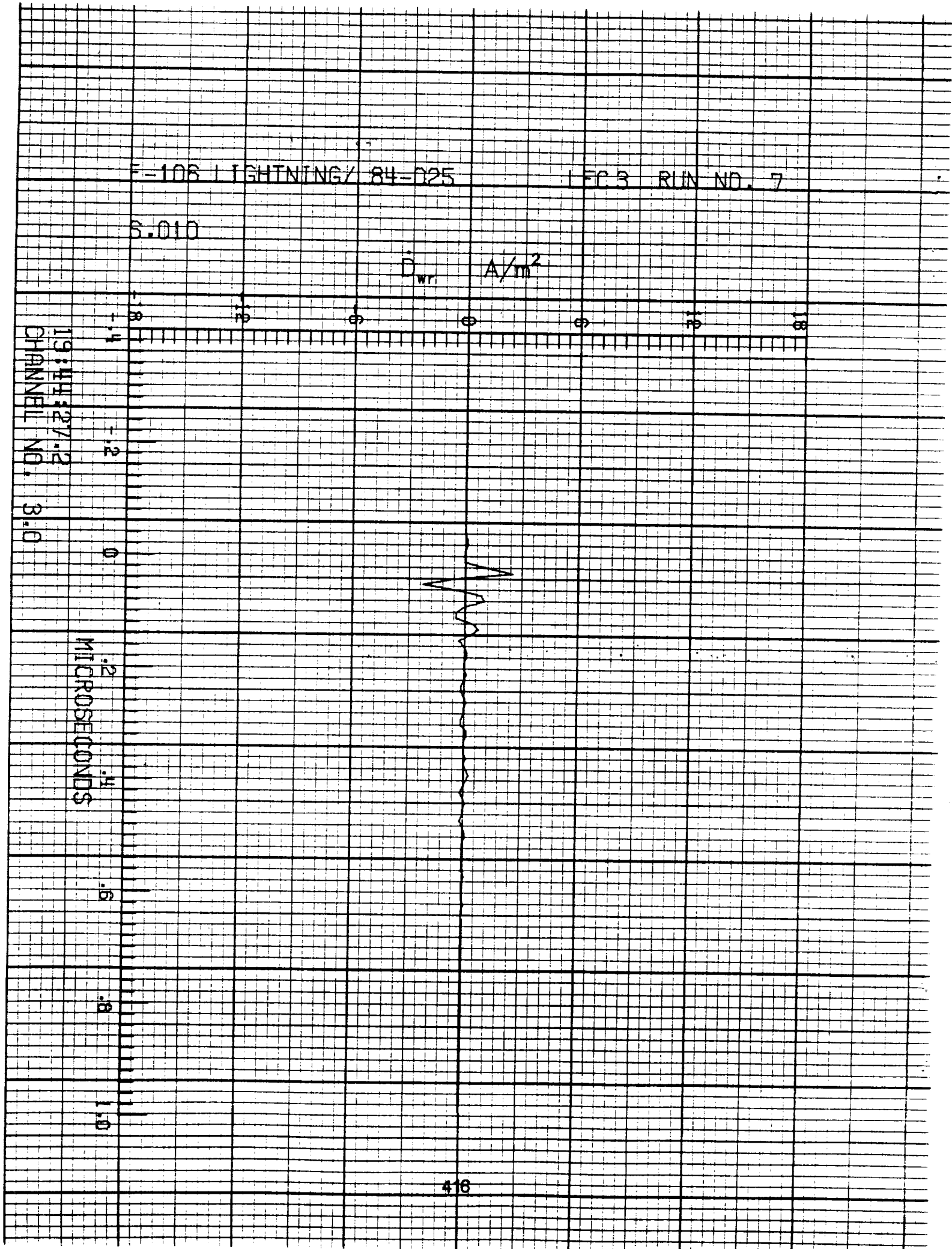

F-106 LIGHTNING/ 84-025
LFC2 RUN NO. 7
6.010
İ A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:44:27.2
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

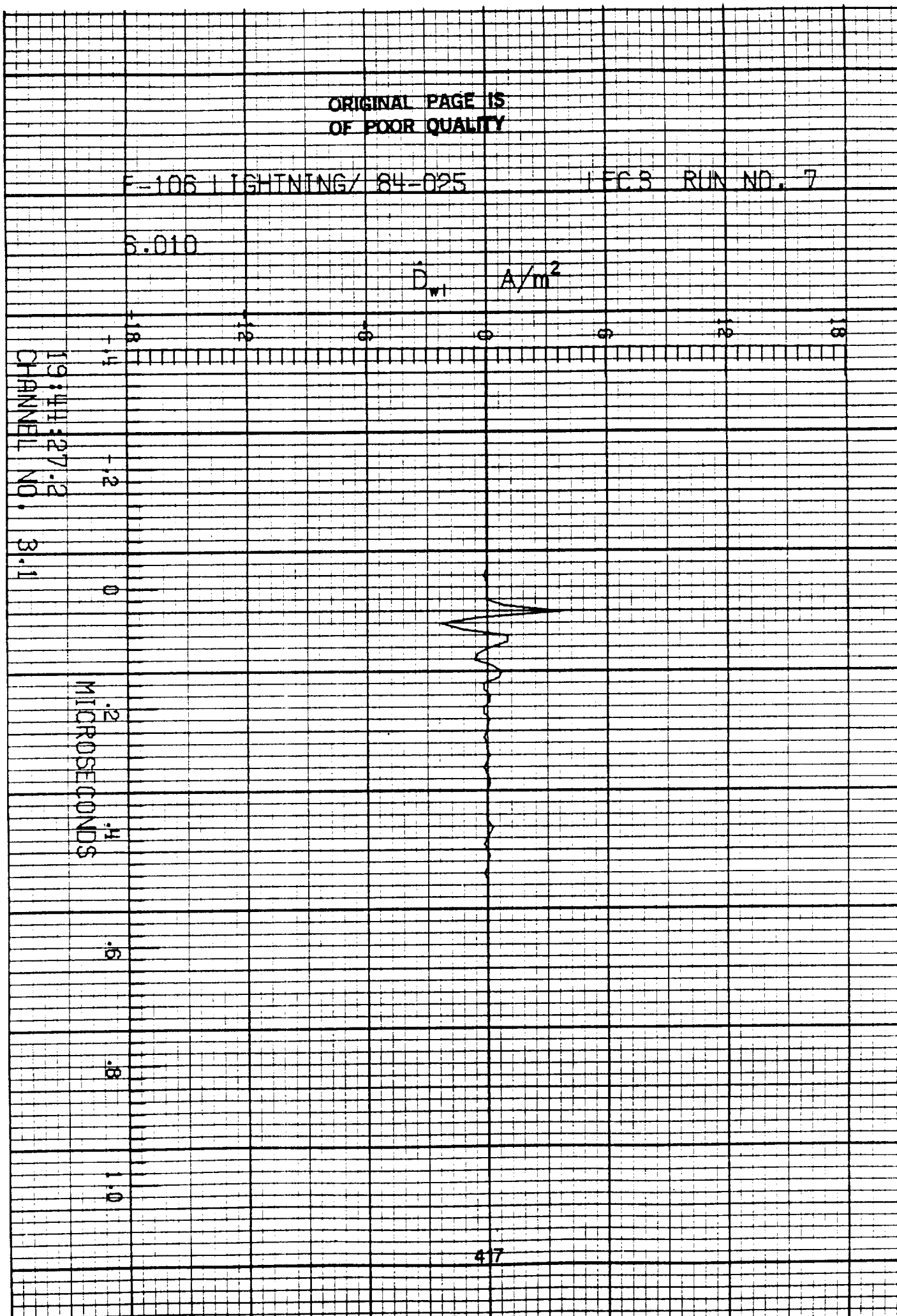
F-106 LIGHTNING/ 84-025 FCP RUN NO. 7






F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 7
6.010
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:44:27.2
CHANNEL NO. 3.0

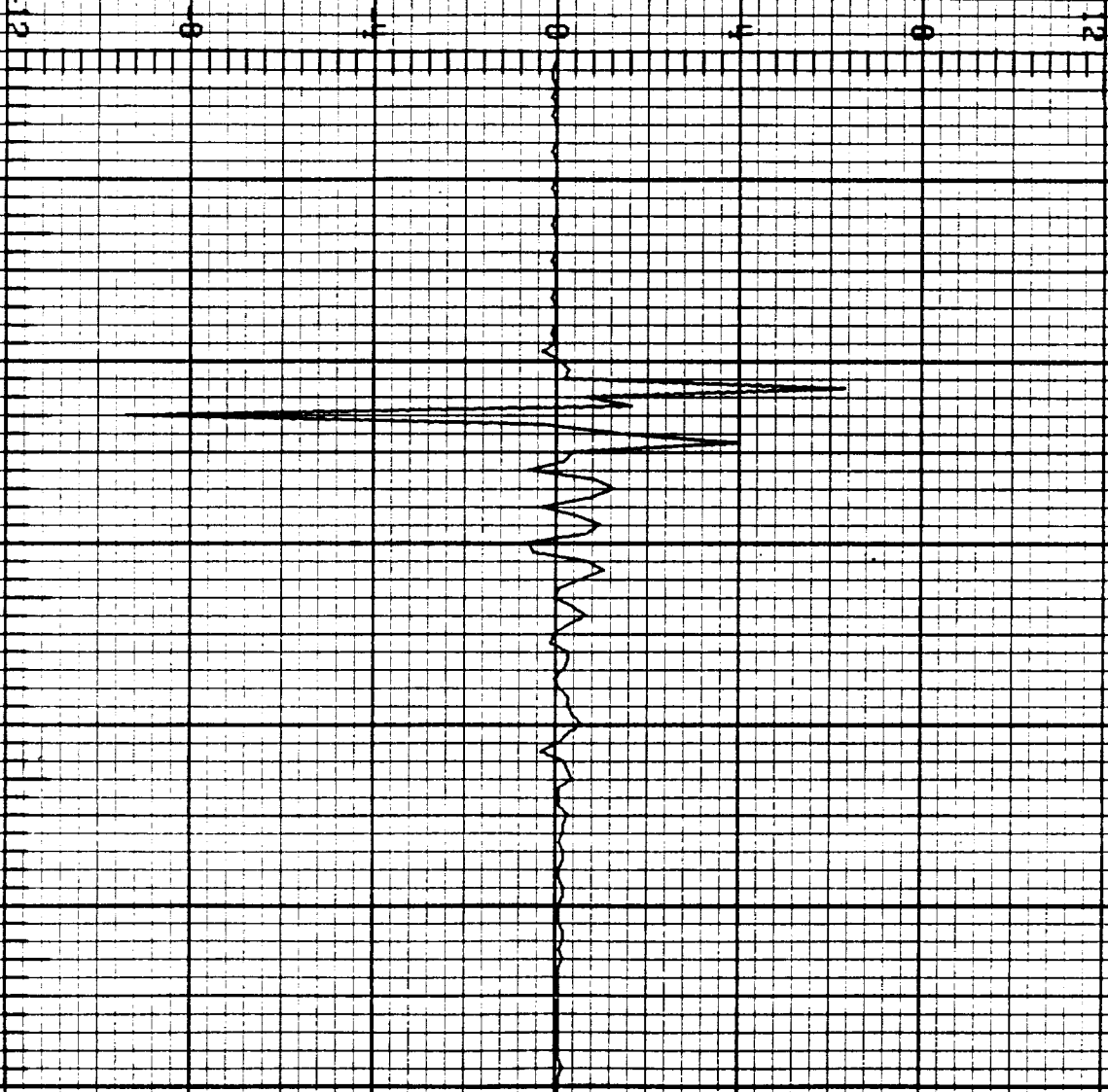
ORIGINAL PAGE IS
OF POOR QUALITY



F-106 LIGHTNING/ 84-025 IFC 3 RUN NO. 7

6.010

$\dot{D}_f$ A/m^2



CHANNEL NO. 3.2 19:44:27.2

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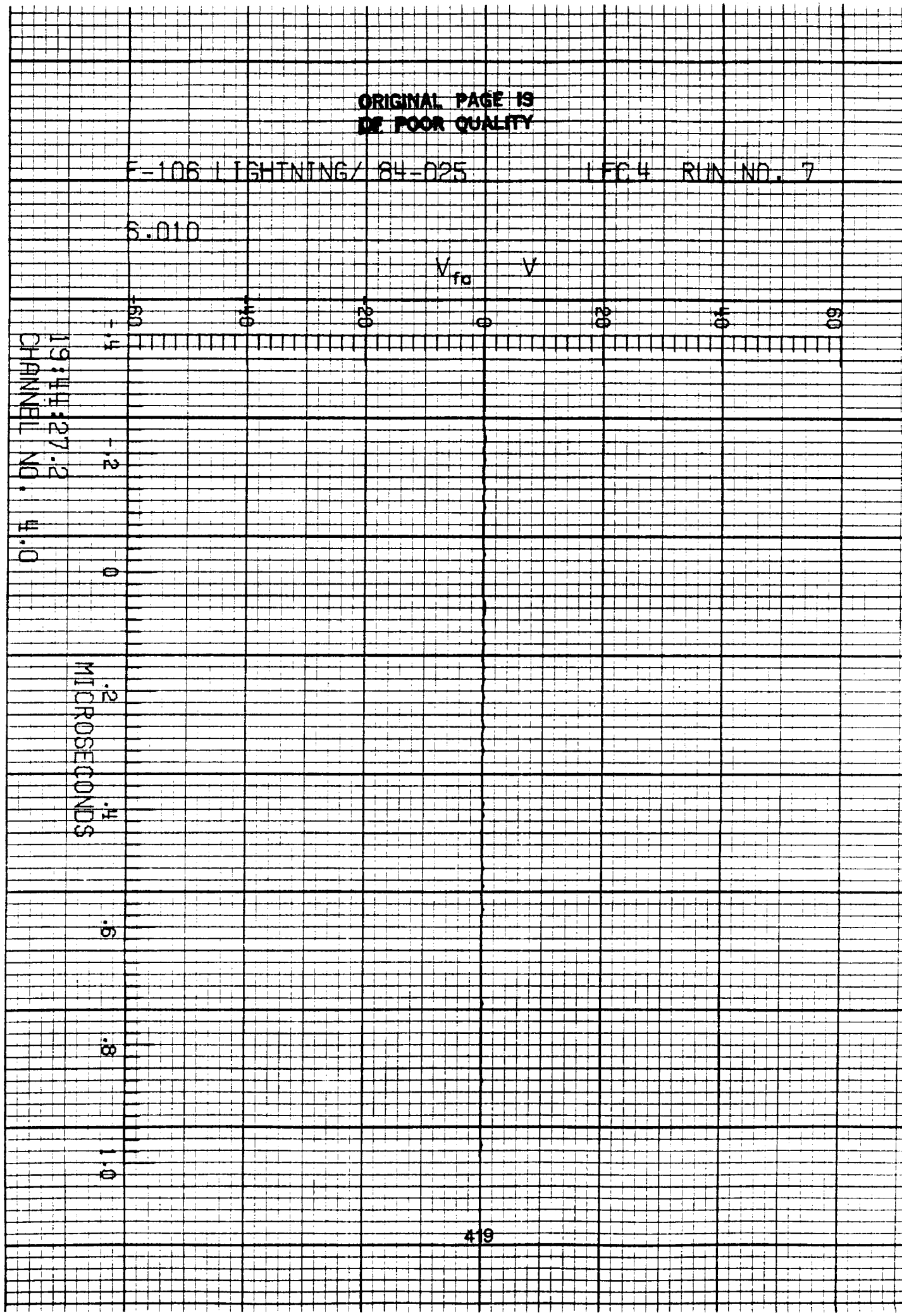
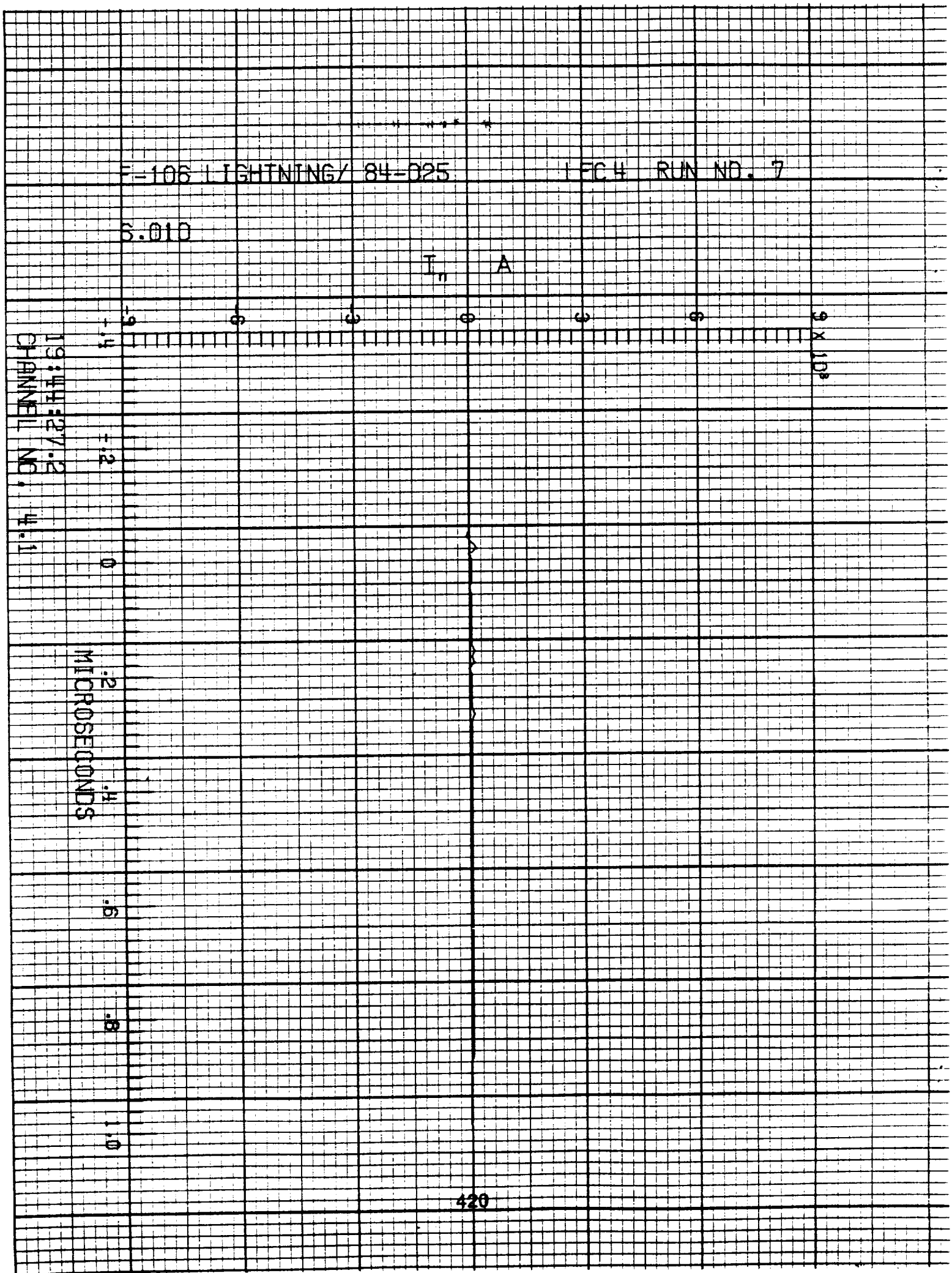


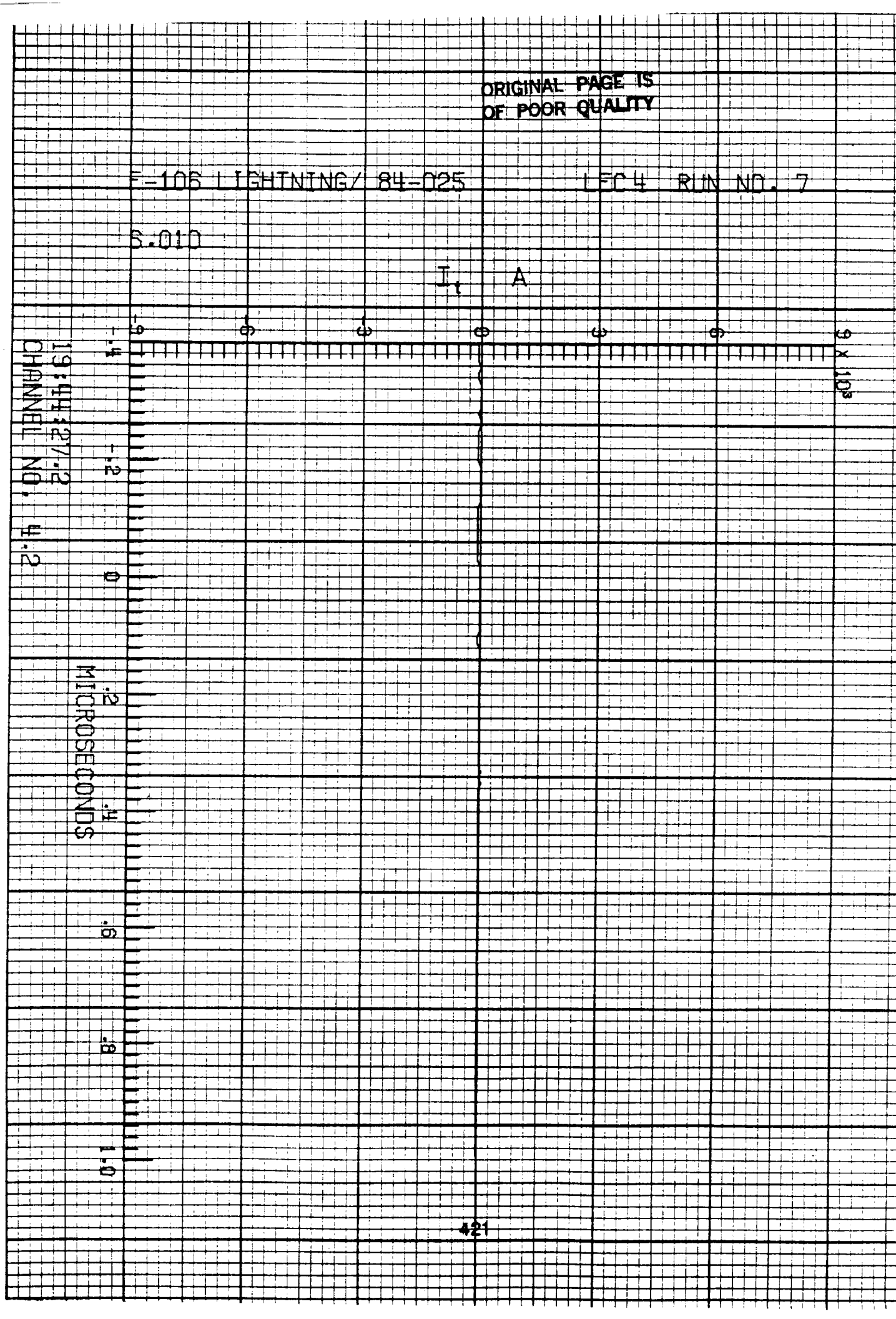

F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 7
6.010
I_n A
-9
-6
-3
0
3
6
9 x 10^8
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
19:44:27.2
CHANNEL NO. 4.1

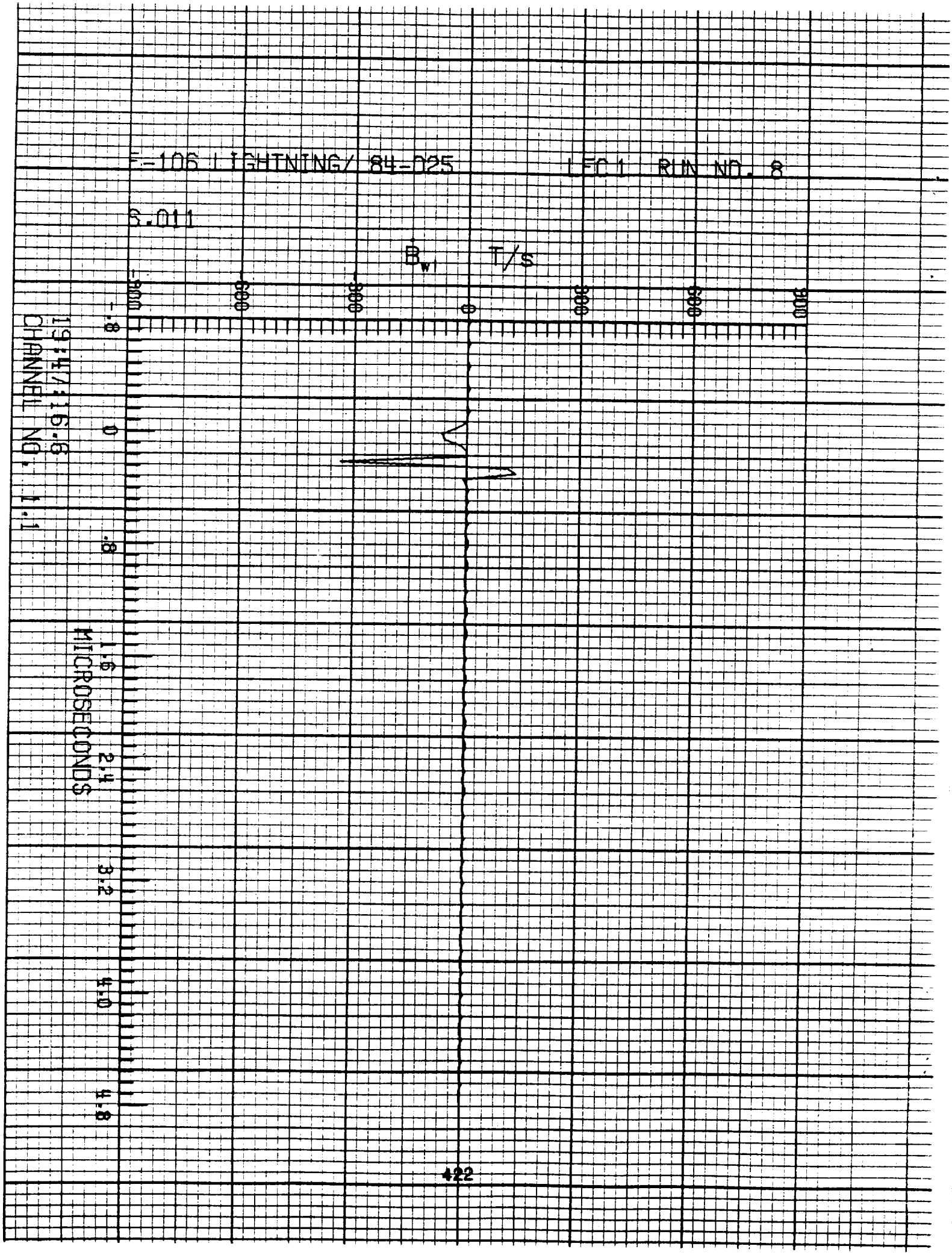
ORIGINAL PAGE IS
OF POOR QUALITY

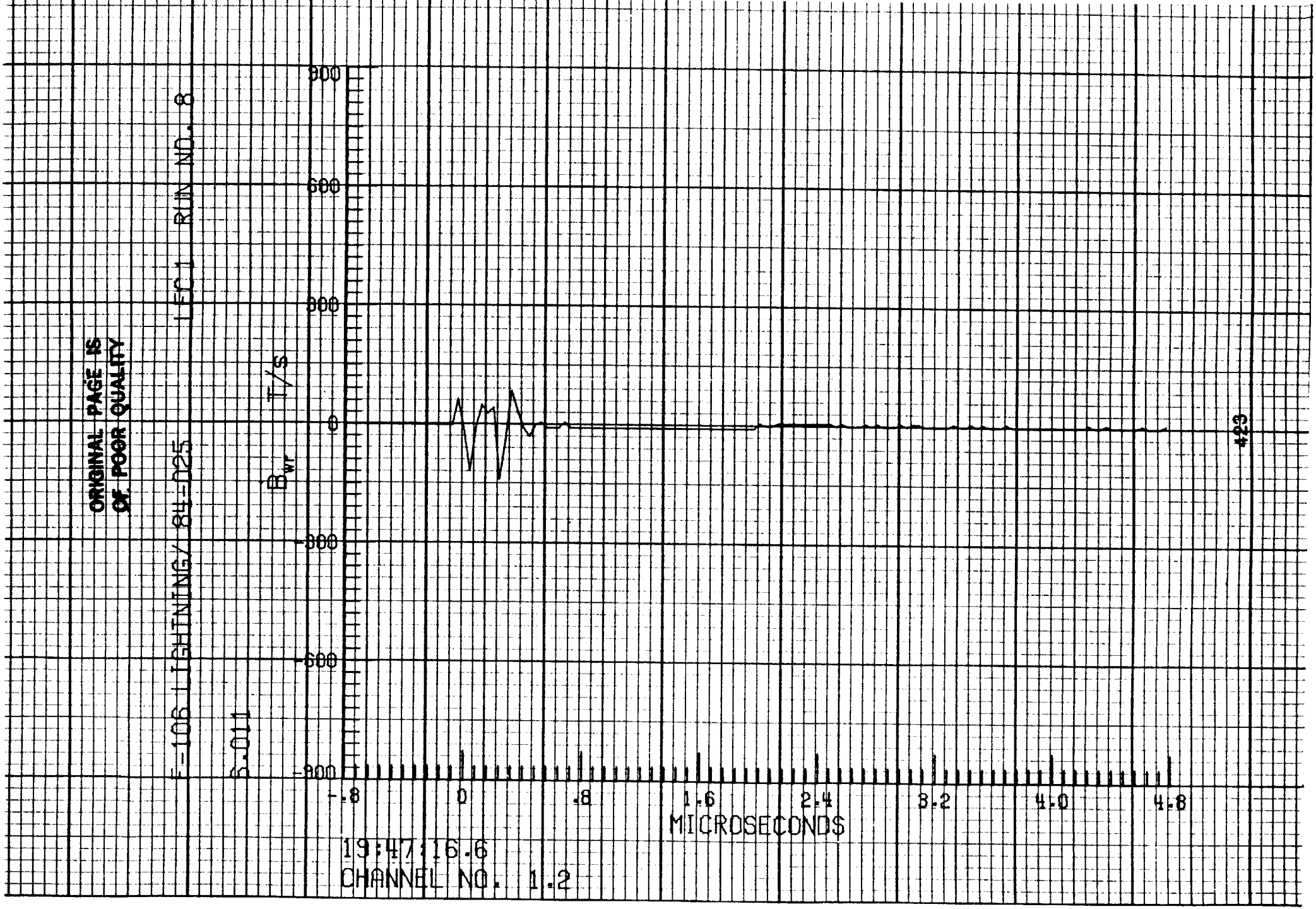
F-106 LIGHTNING/ 84-025 LEC4 RUN NO. 7

6.010

I_t A




F-106 LIGHTNING/ 84-025
LEC 1 RUN NO. 8
S.011
$\dot{B}_{w1}$ T/s
-900
-600
-300
0
300
600
900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:47:16.6
CHANNEL NO. 1.1


ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LFC 1 RUN NO. 8
6.011
B_{wr} F/S
900
600
300
0
-300
-600
-900
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS
19:47:16.6
CHANNEL NO. 1.2
423

F-106 LIGHTNING/ 84-025 LEC 2 RUN NO. 8

6.011

D_t A/m^2

-3 -2 -1 0 1 2 3

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

CHANNEL NO. 2.0 19:47:16.6

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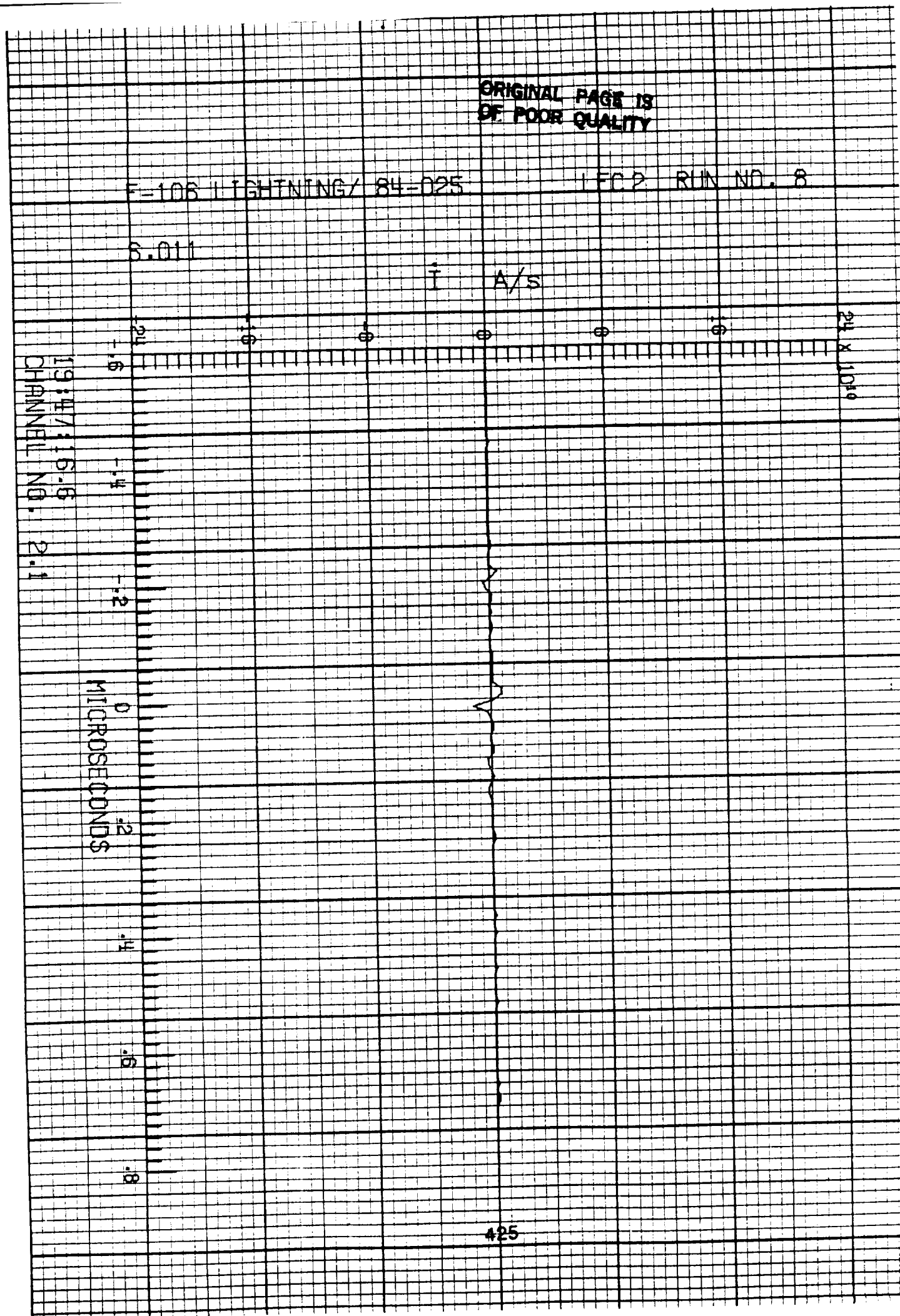

F-106 LIGHTNING/ 84-025 LFCP RUN NO. 8

6.011

$\dot{B}_1$ T/s

-1800 -1200 -600 0 600 1200 1800

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

CHANNEL NO. 2.5 19:47:16.6

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F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 8

6.011

$\dot{D}_{wr}$ A/m^2

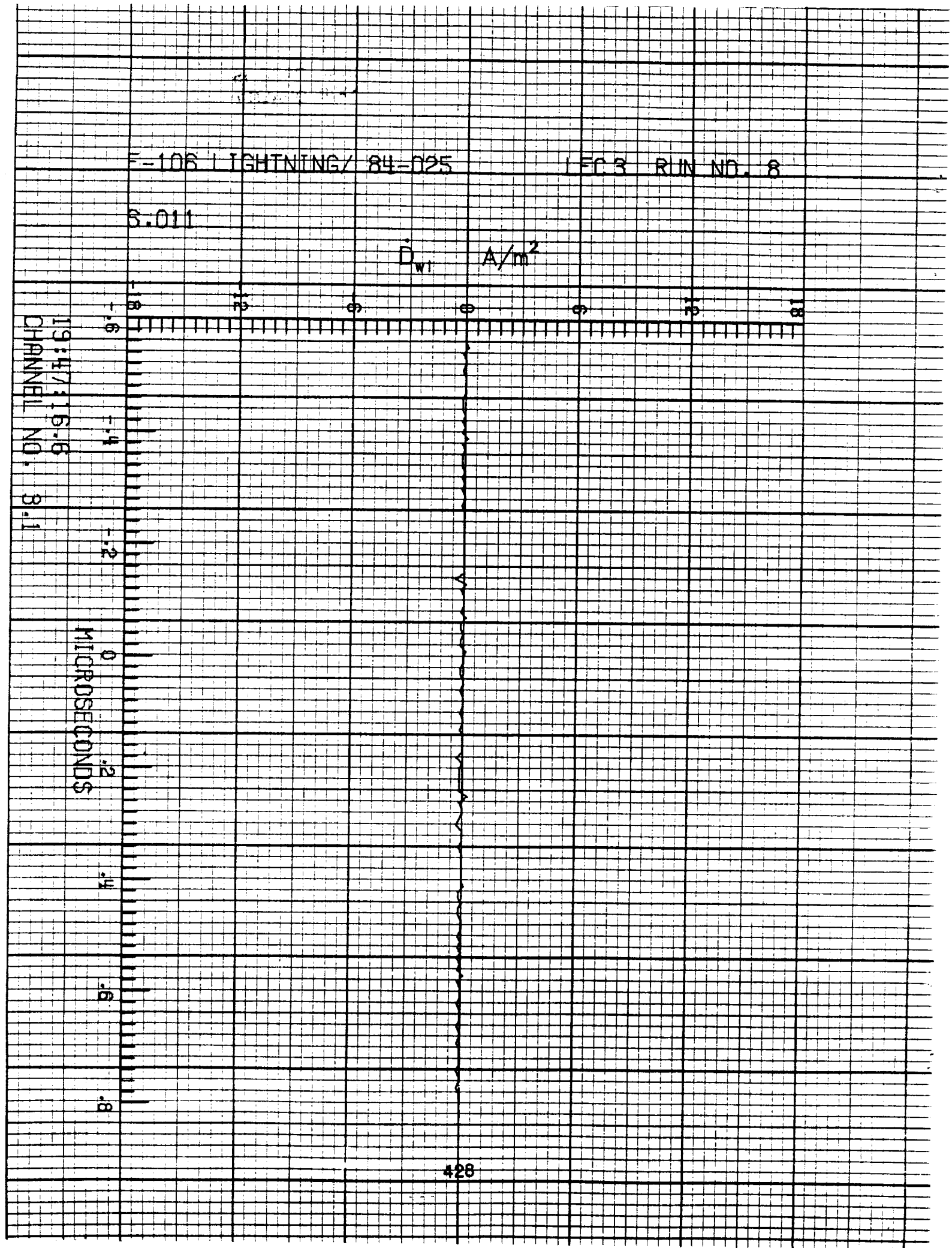
-18 -12 -6 0 6 12 18

-.6 -.4 -.2 0 .2 .4 .6 .8

MICROSECONDS

CHANNEL NO. 8.0

19:47:16.6


F-106 LIGHTNING/ 84-025 LFC 3 RUN NO. 8
6.011
$\dot{D}_{wi}$ A/m^2
-.8
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
CHANNEL NO. 8:1
19:47:16.6

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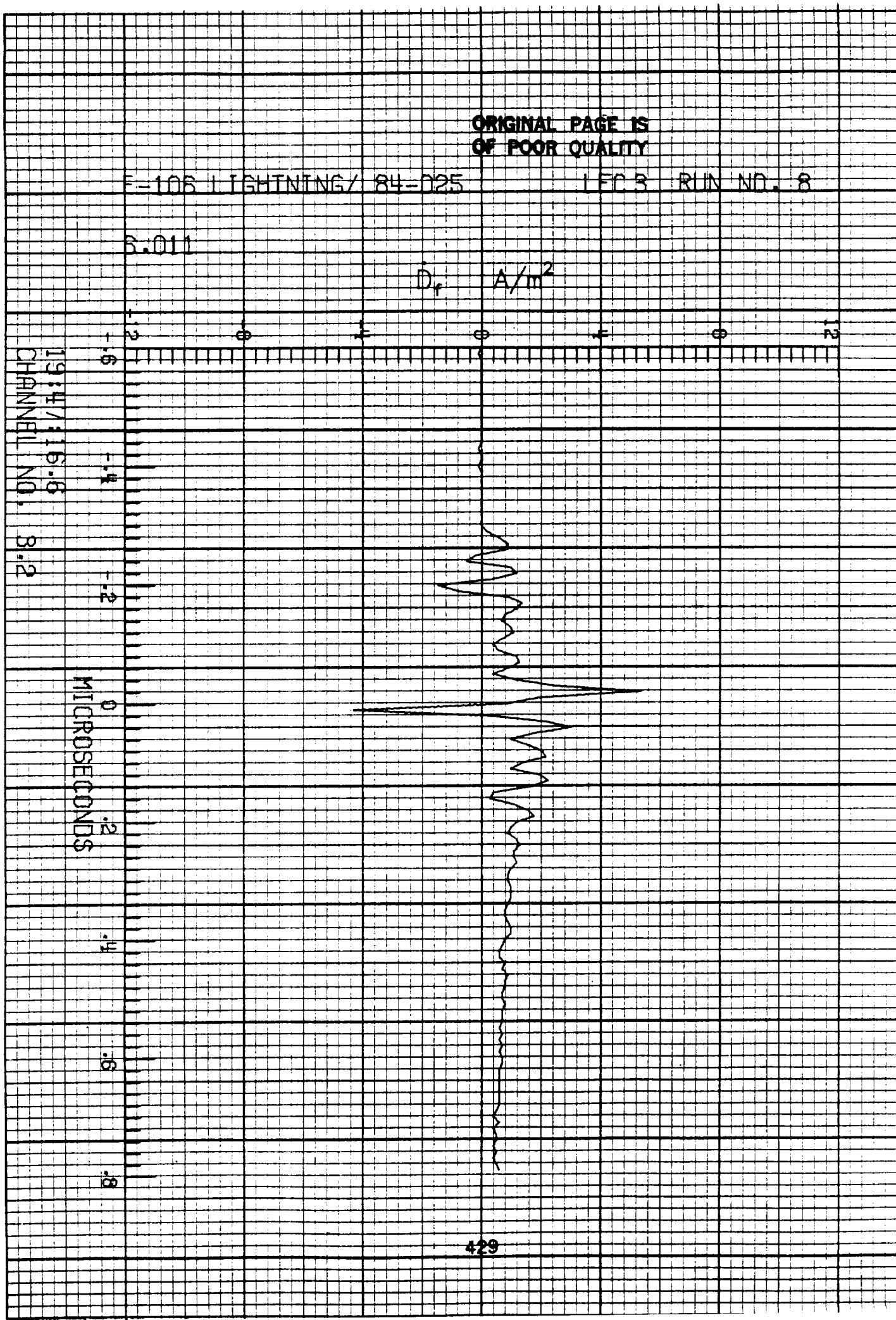

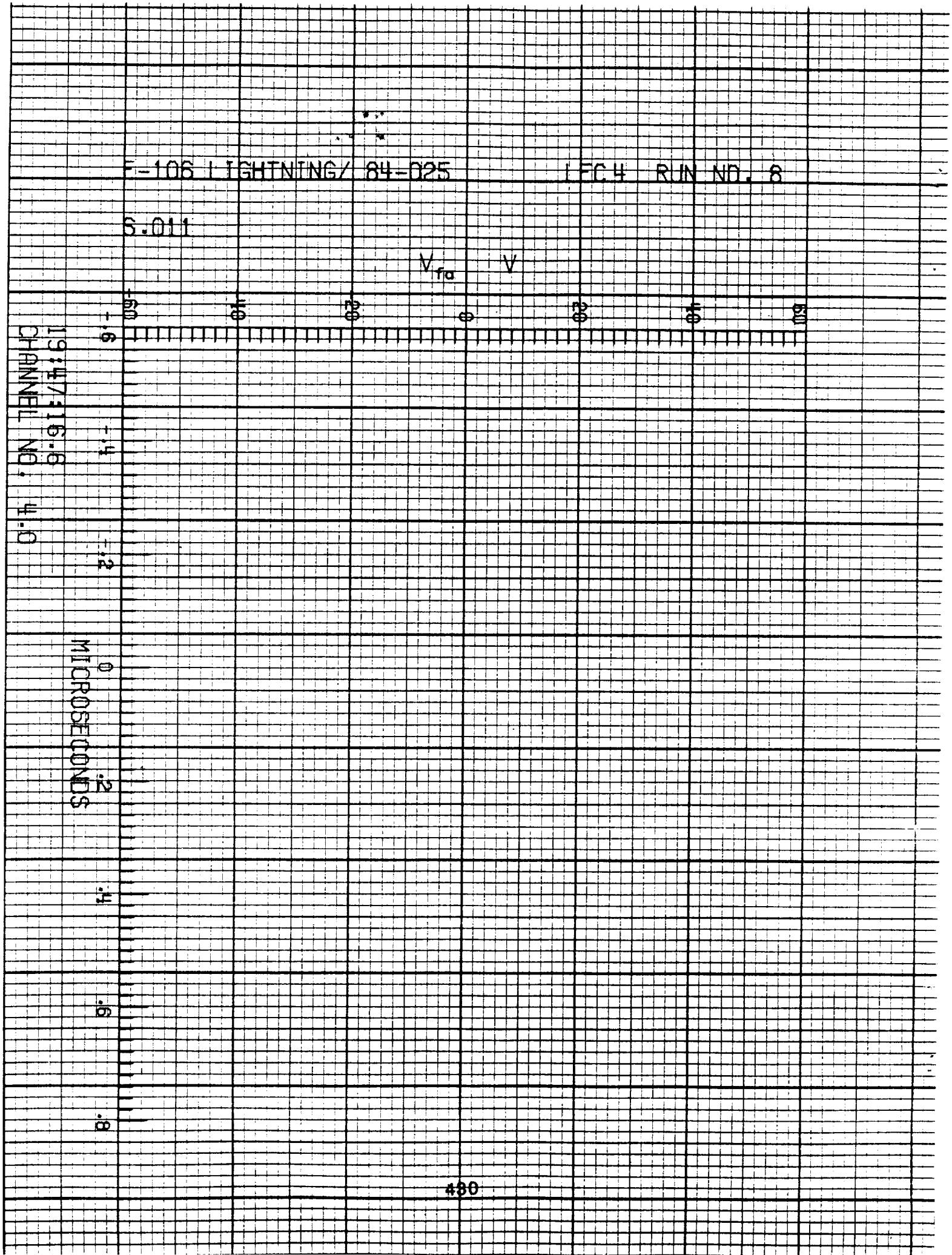
F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 8
S.011
V_{fa} V
-60
-40
-20
0
20
40
60
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:47:16.6
CHANNEL NO. 4.0

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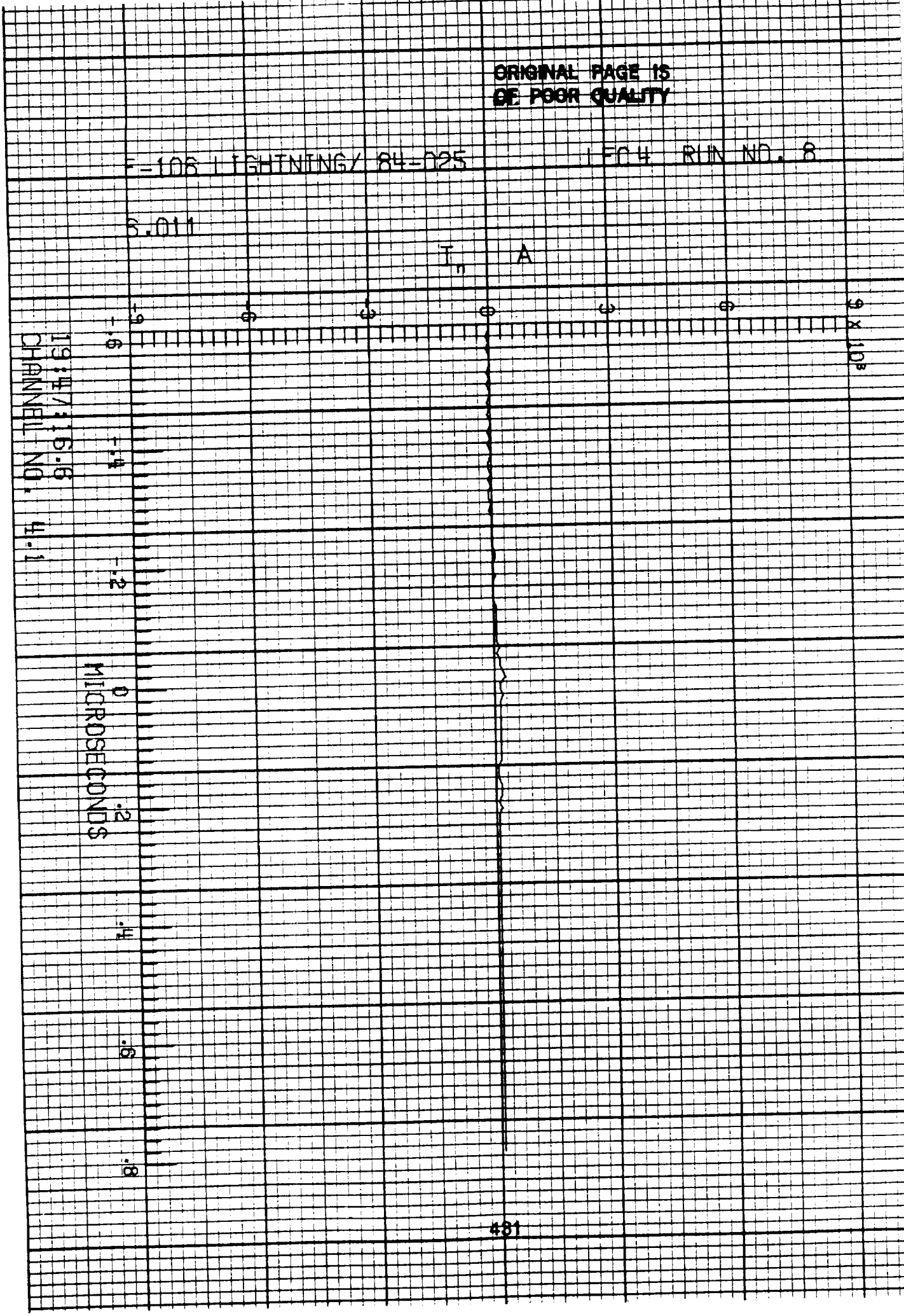
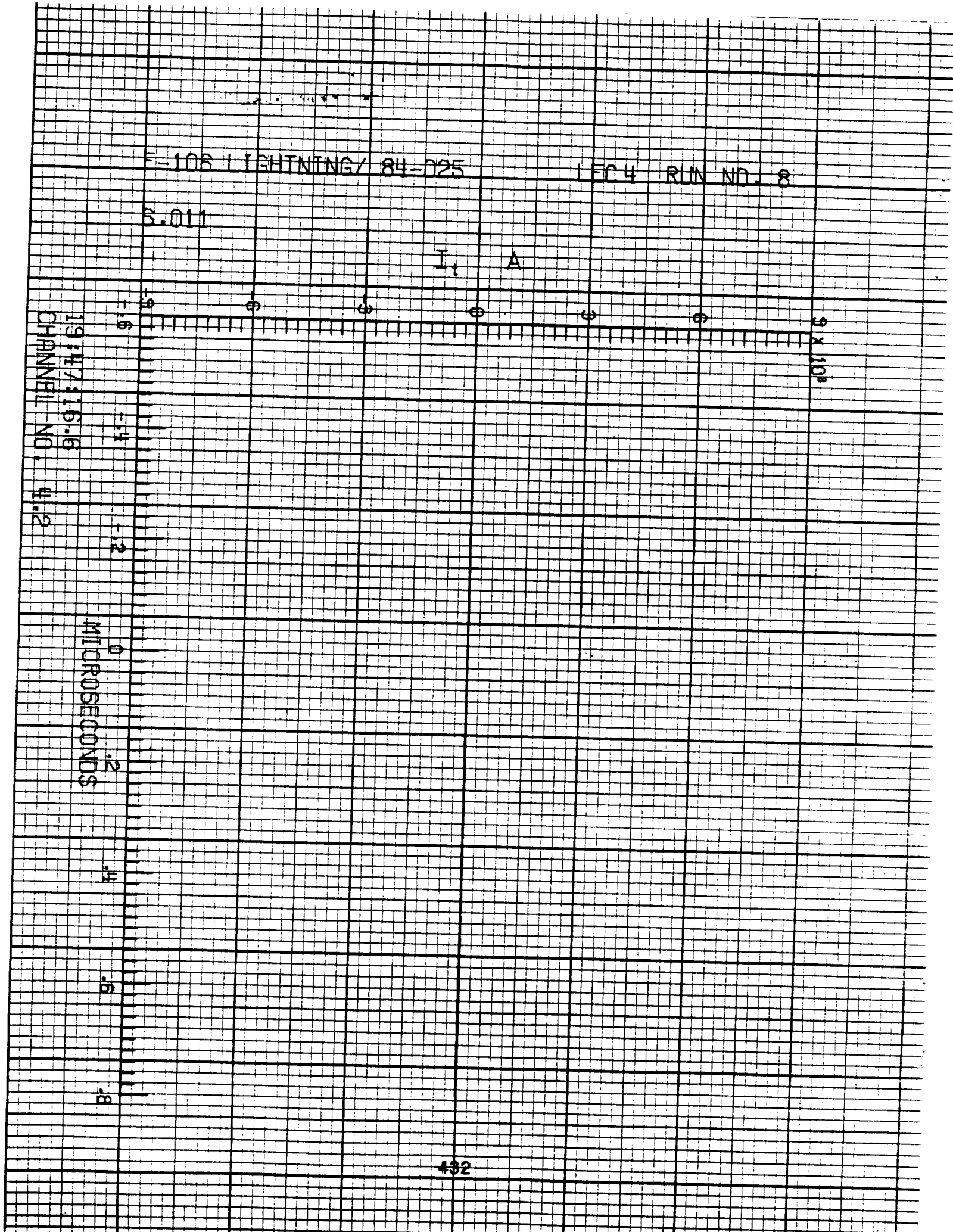
F-106 LIGHTNING/ 84-025 LFC4 RUN NO. 8

6.011

I_n A




F-106 LIGHTNING/ 84-025
LEC4 RUN NO. 8
6.011
I_t A
-9
-6
-3
0
3
6
9 x 10⁸
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:47:16.6
CHANNEL NO. 4.2

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F-106 LIGHTNING/ 84-025 LEC 1 RUN NO. 9

6.012

$\dot{B}_{w1}$ T/S

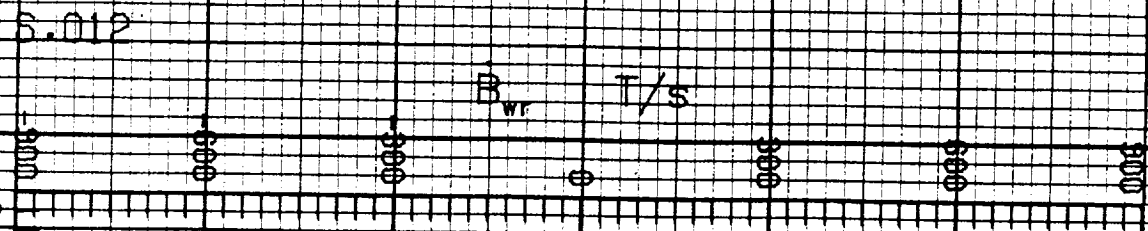
-800 -600 -400 -200 0 200 400 600 800

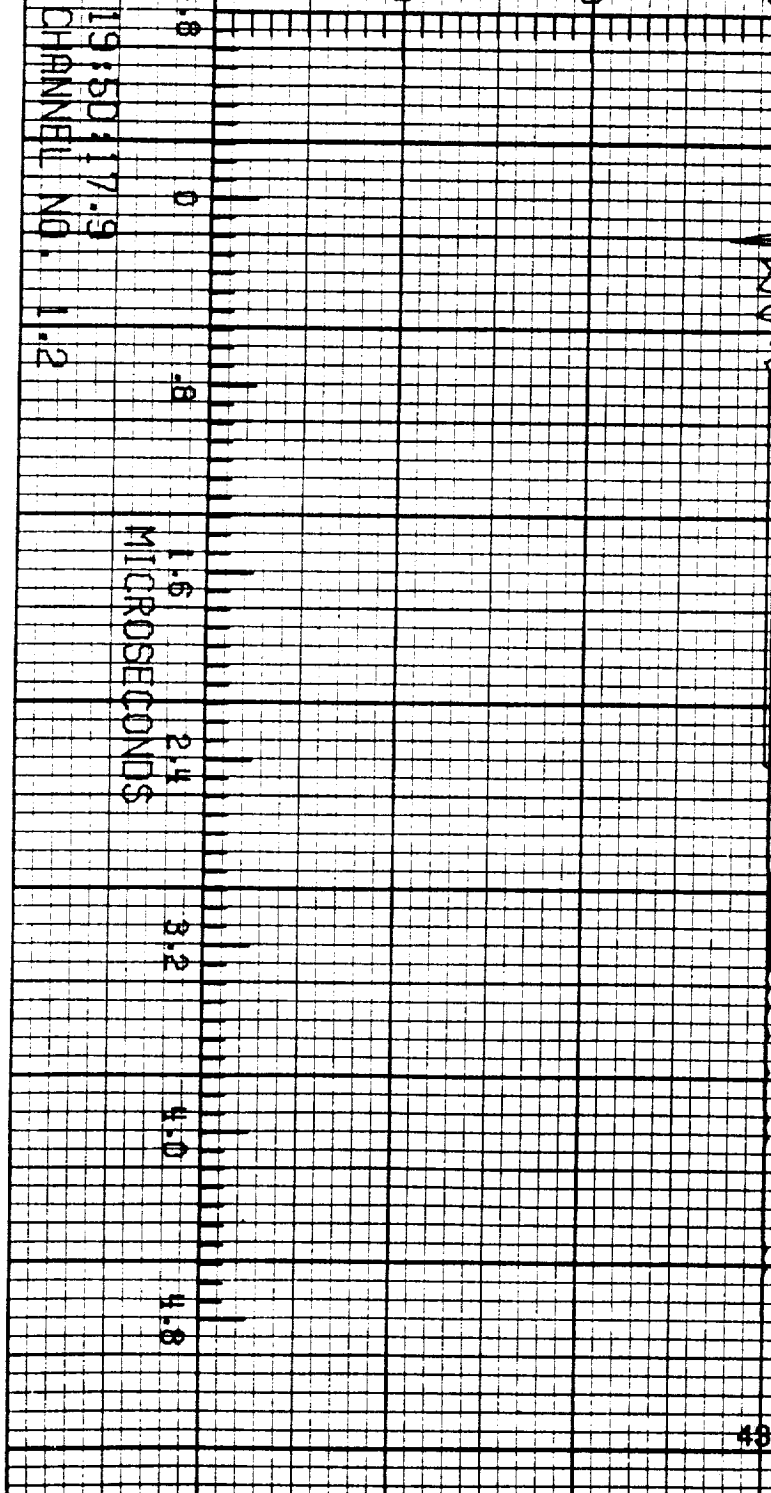
CHANNEL NO. 1.1 19:50:17.9

-1.8 0 1.8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

F-106 LIGHTNING/ 84-025 LEC 1 RUN NO. 9





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F-106 LIGHTNING/ 84-025 LFC2 RUN NO. 9

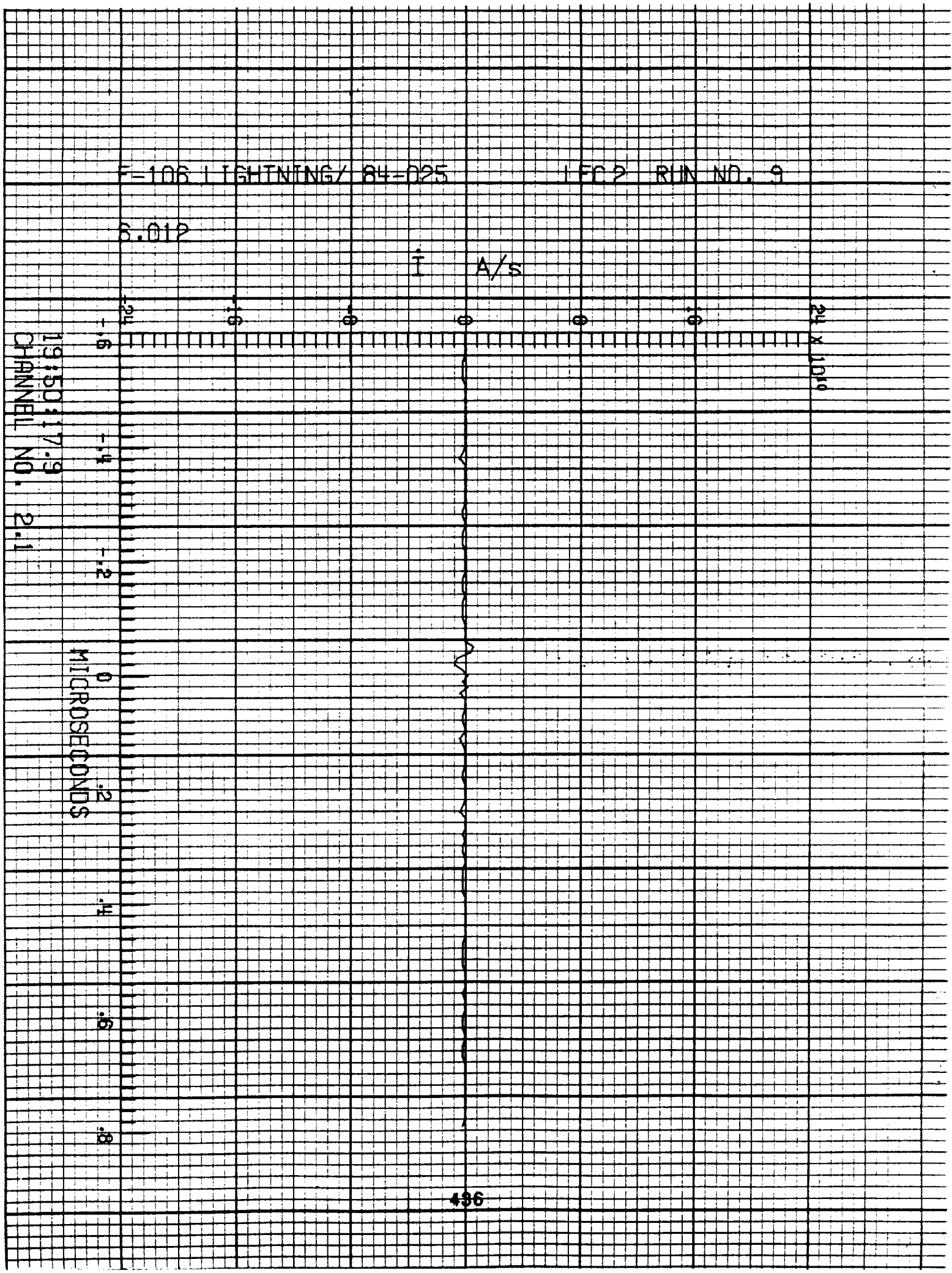
6.012

$\hat{D}_t$ A/m^2

+.6 +.4 +.2 0 -.2 -.4 -.6 -.8

MICROSECONDS

CHANNEL NO. 2D 19:50:17.9


F-106 LIGHTNING/ 84-025
LFC 2 RUN NO. 9
6.012
Ī A/s
-24
-16
-8
0
8
16
24 x 10^10
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:50:17.9
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LFC2 RUN NO. 9

6.012

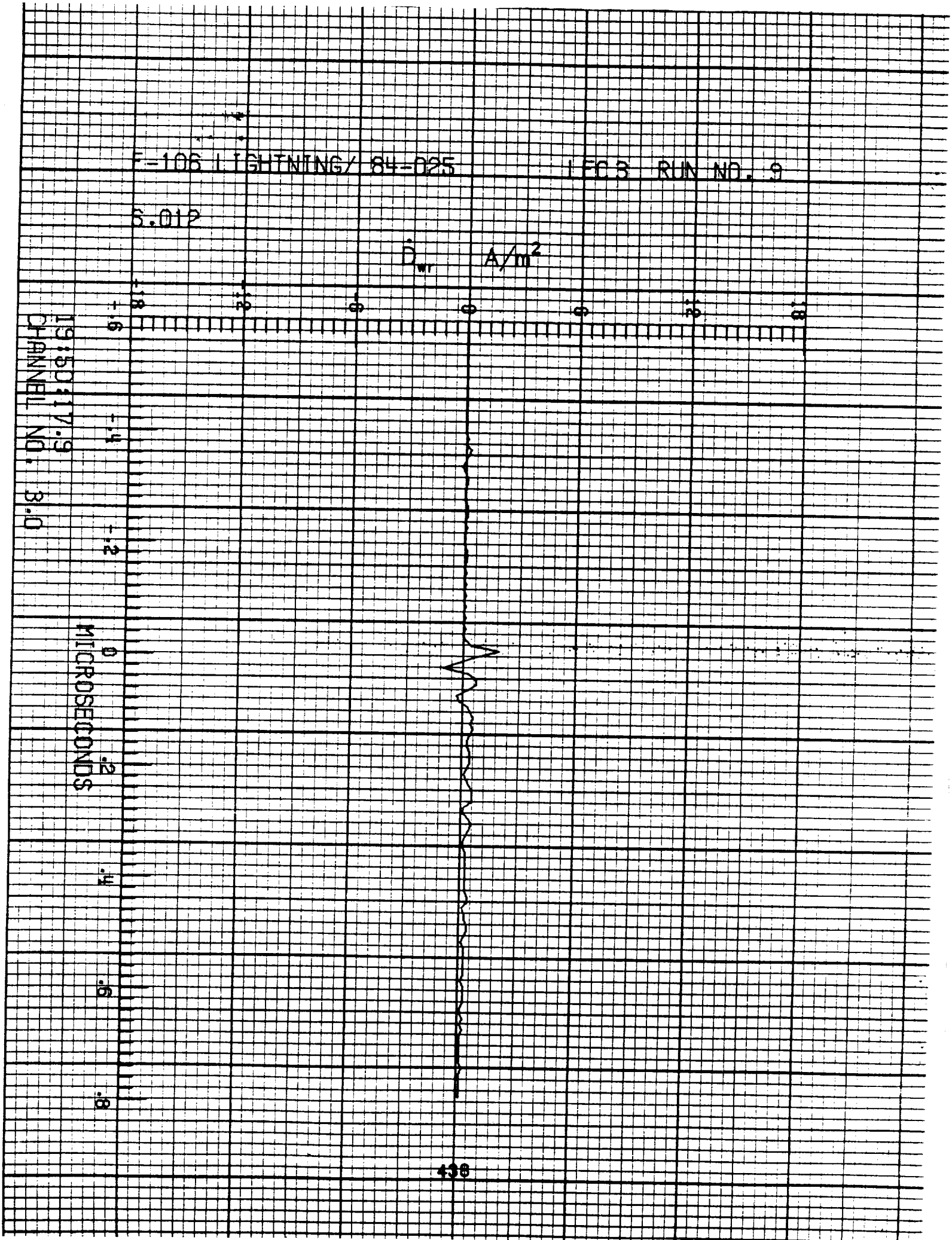
$\dot{B}_1$ T/s

-1800 -1200 -800 0 800 1200 1800

+.6 +.4 +.2 0 -.2 -.4 -.6 -.8

MICROSECONDS

15:50:17.69 CHANNEL NO. 2


F-106 LIGHTNING/ 84-025
LFC3 RUN NO. 9
6.012
$\dot{D}_{wr}$ A/m^2
-18
-12
-6
0
6
12
18
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:50:17.9
CHANNEL NO. 3.0

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F-106 LIGHTNING/ 84-025 IFC 3 RUN NO. 9

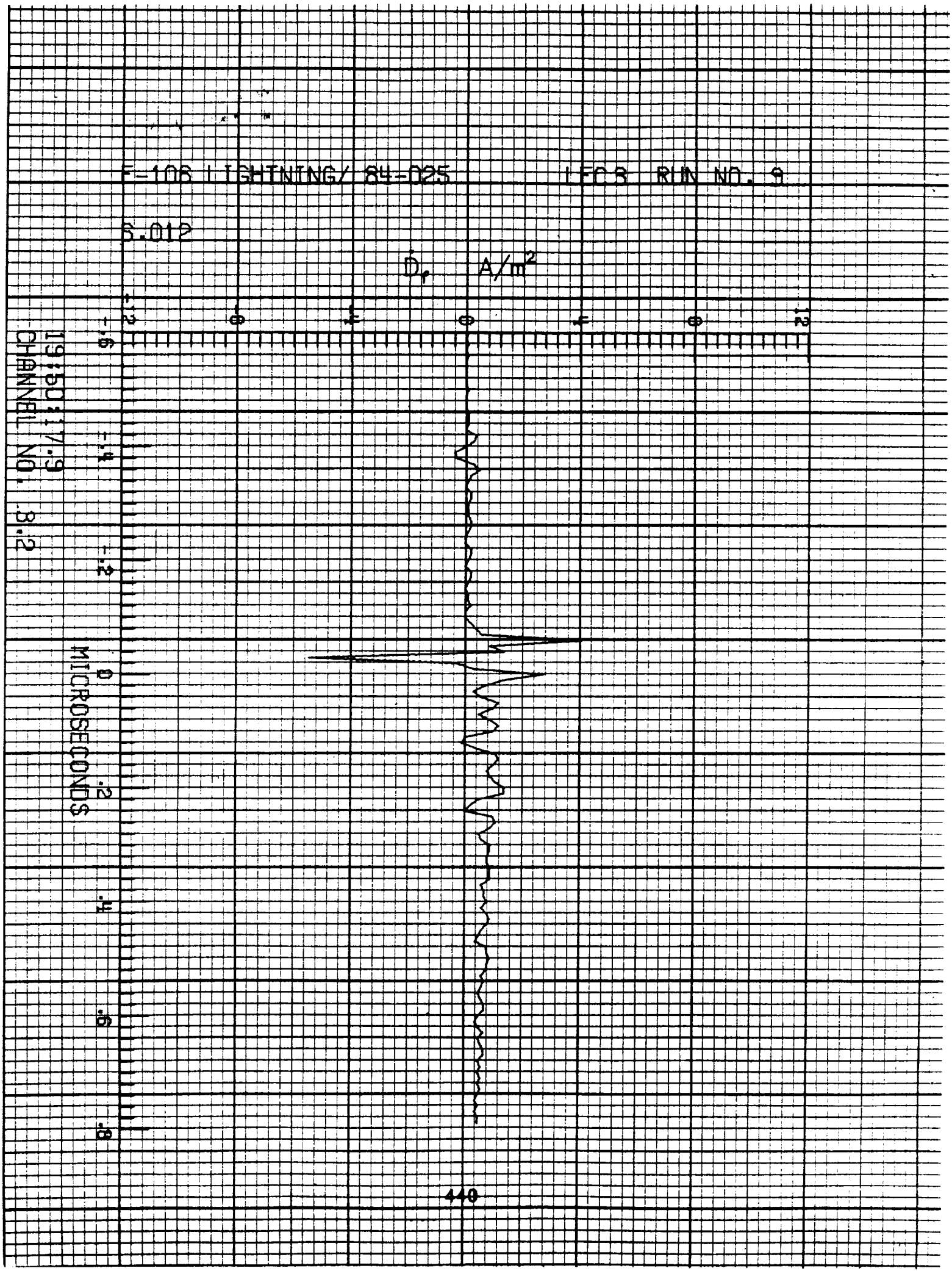
6.012

$\dot{D}_{w1}$ A/m^2

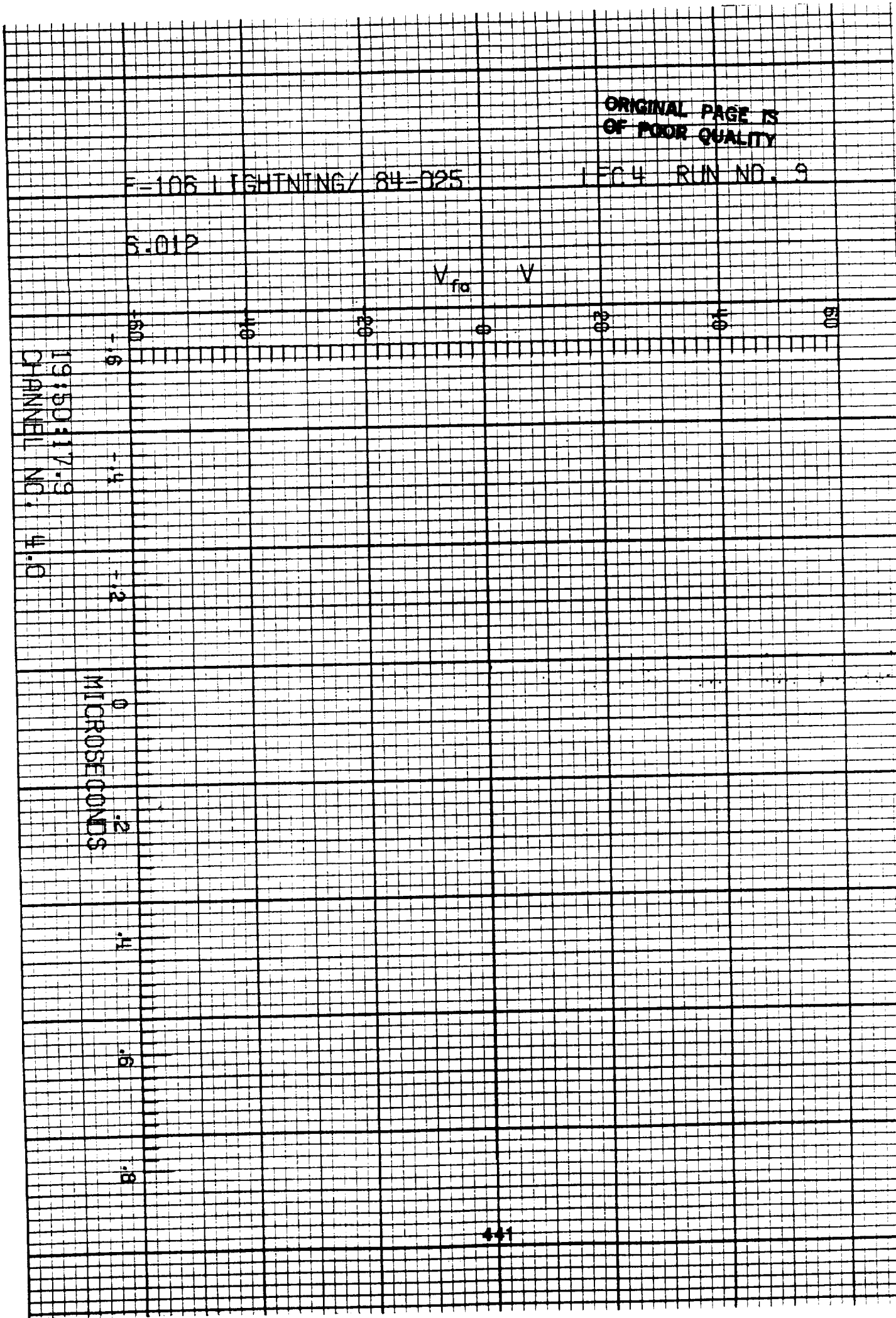
-1.6 -1.4 -1.2 0 .2 .4 .6 .8

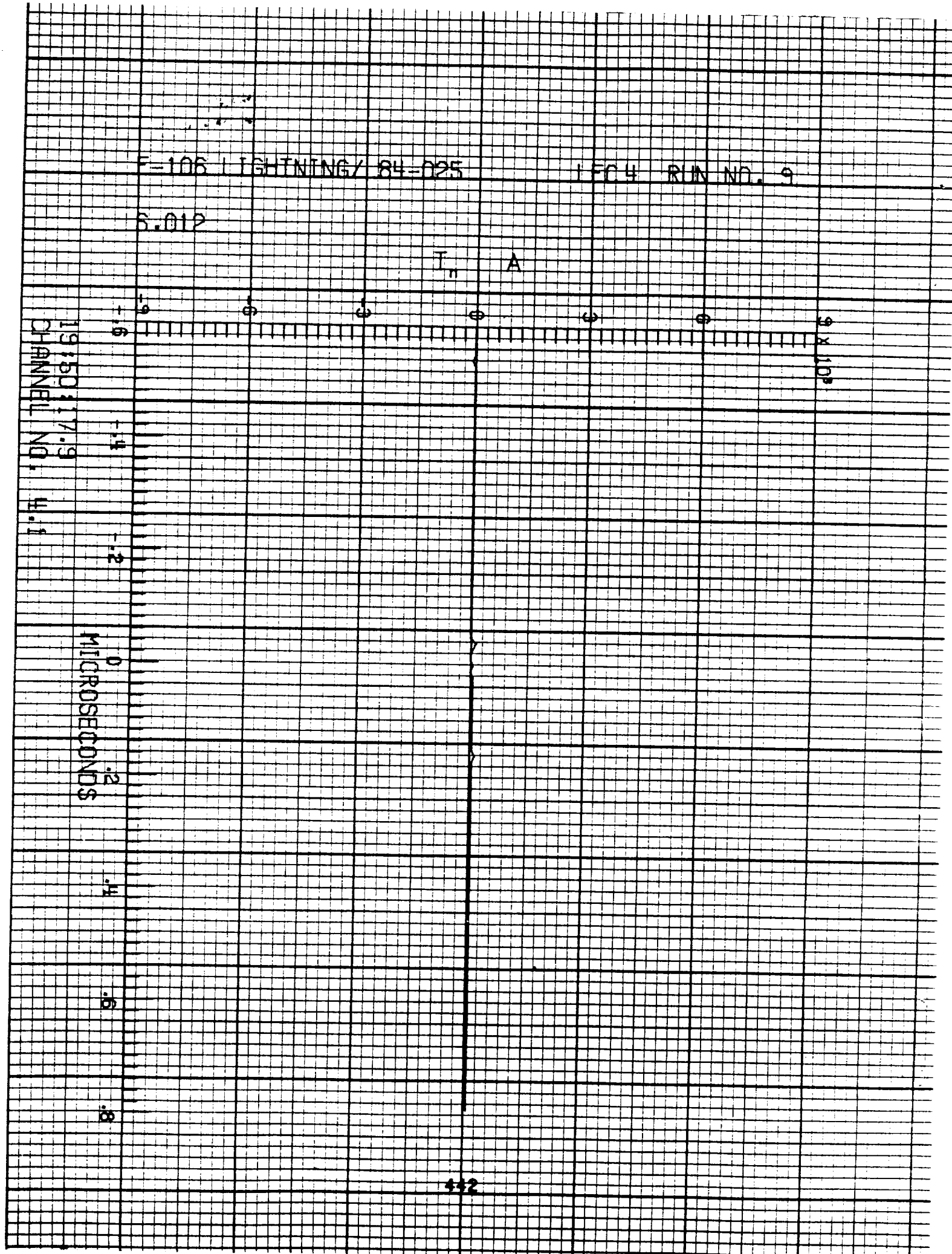
MICROSECONDS

19:50:17.9
CHANNEL NO. 8.1


F-106 LIGHTNING/ 84-025
LFC3 RUN NO. 9
6.012
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:50:17.9
CHANNEL NO. 3.2

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 9
6.012
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:50:17.9
CHANNEL NO. 4.1

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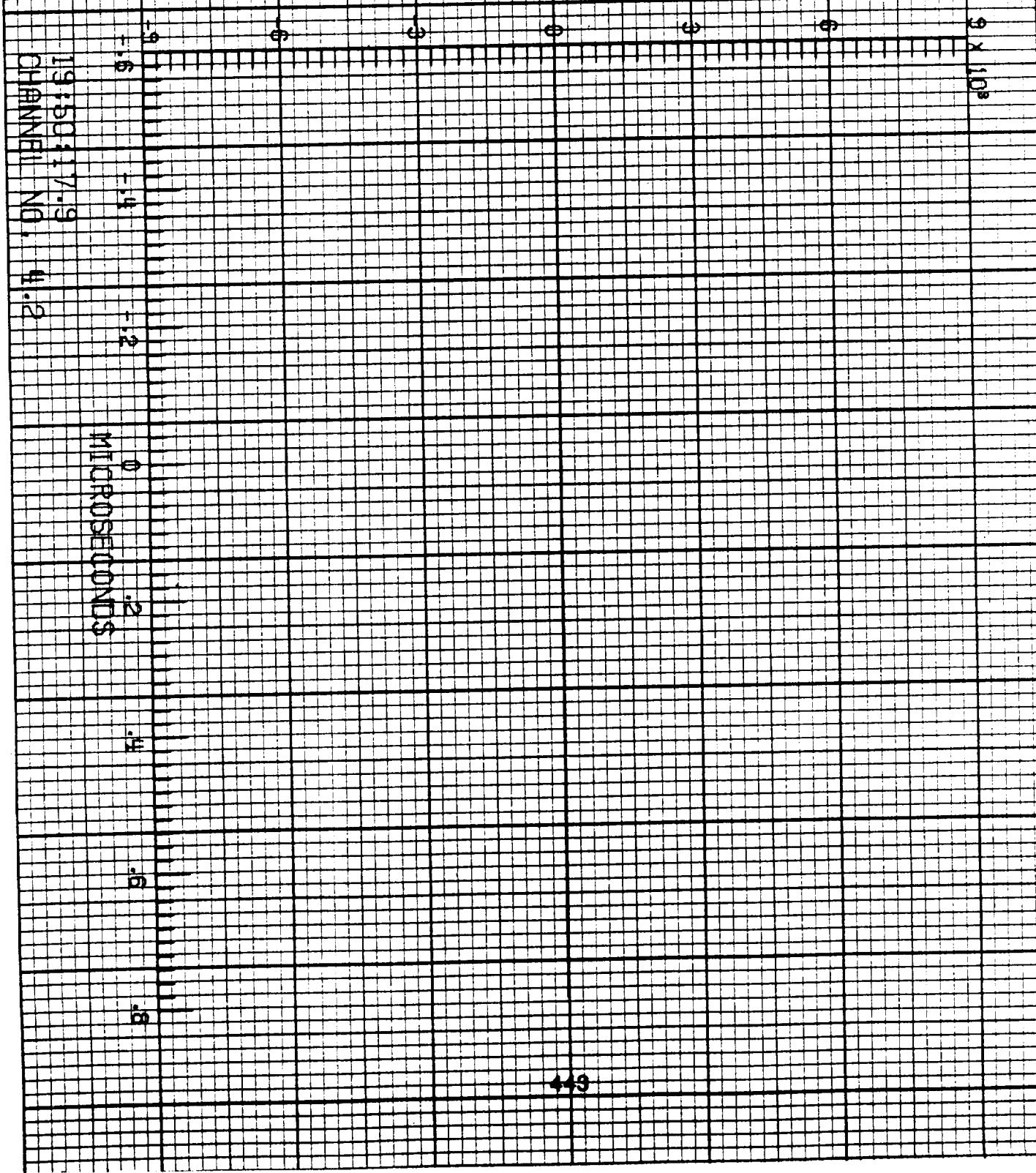
F-106 LIGHTNING/ 84-025 LFC4 RUN NO. 9

6.012

I_t A



F-106 LIGHTNING/ 84-025 LFC 1 RUN NO. 10

6.018

$\dot{B}_{w1}$ T/s

-600 -400 -200 0 200 400 600

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2 1.4 1.6

MICROSECONDS

CHANNEL NO. 13: 67.0.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LEC 1 RUN NO. 10

6.018

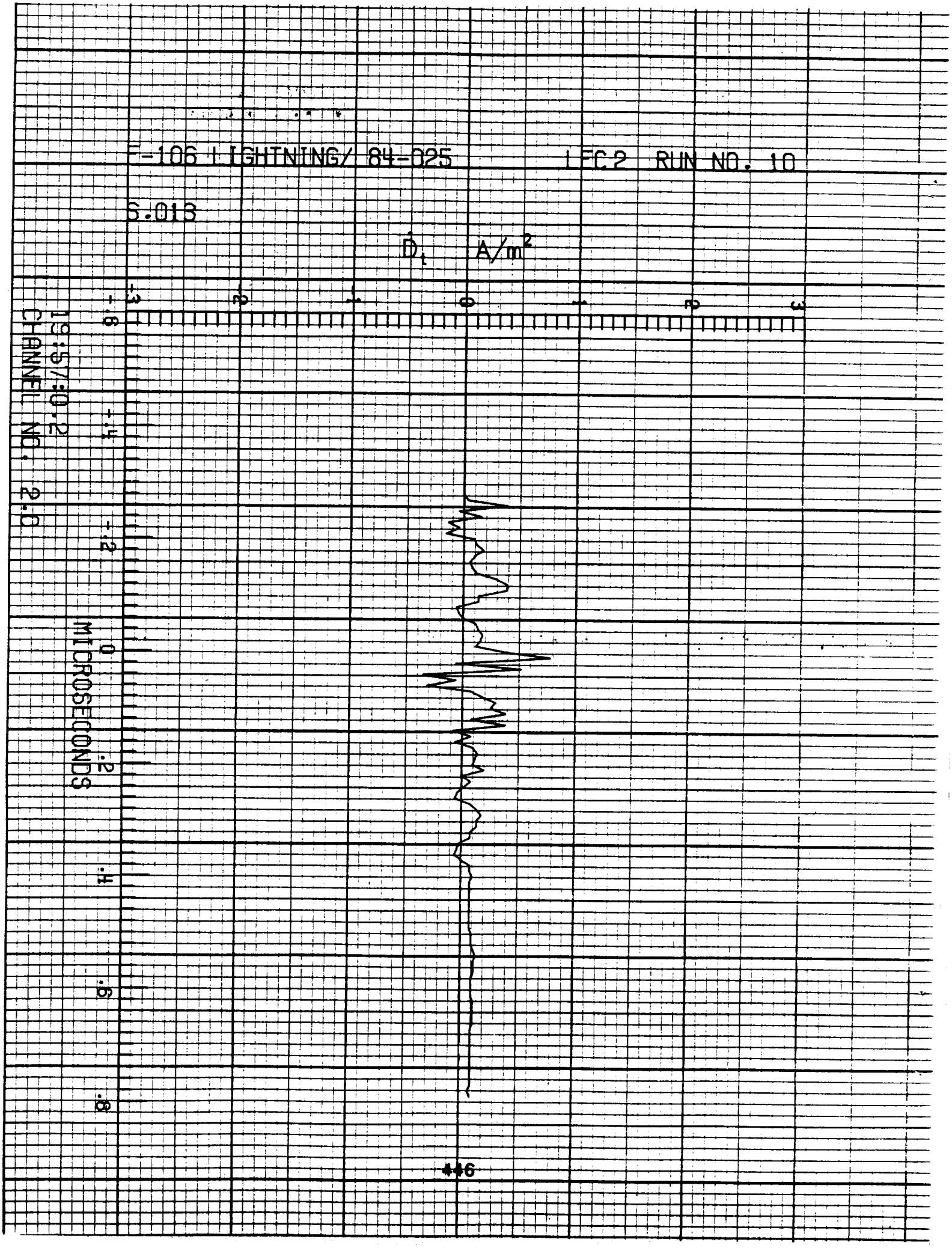
$\dot{B}_{wr}$ T/S

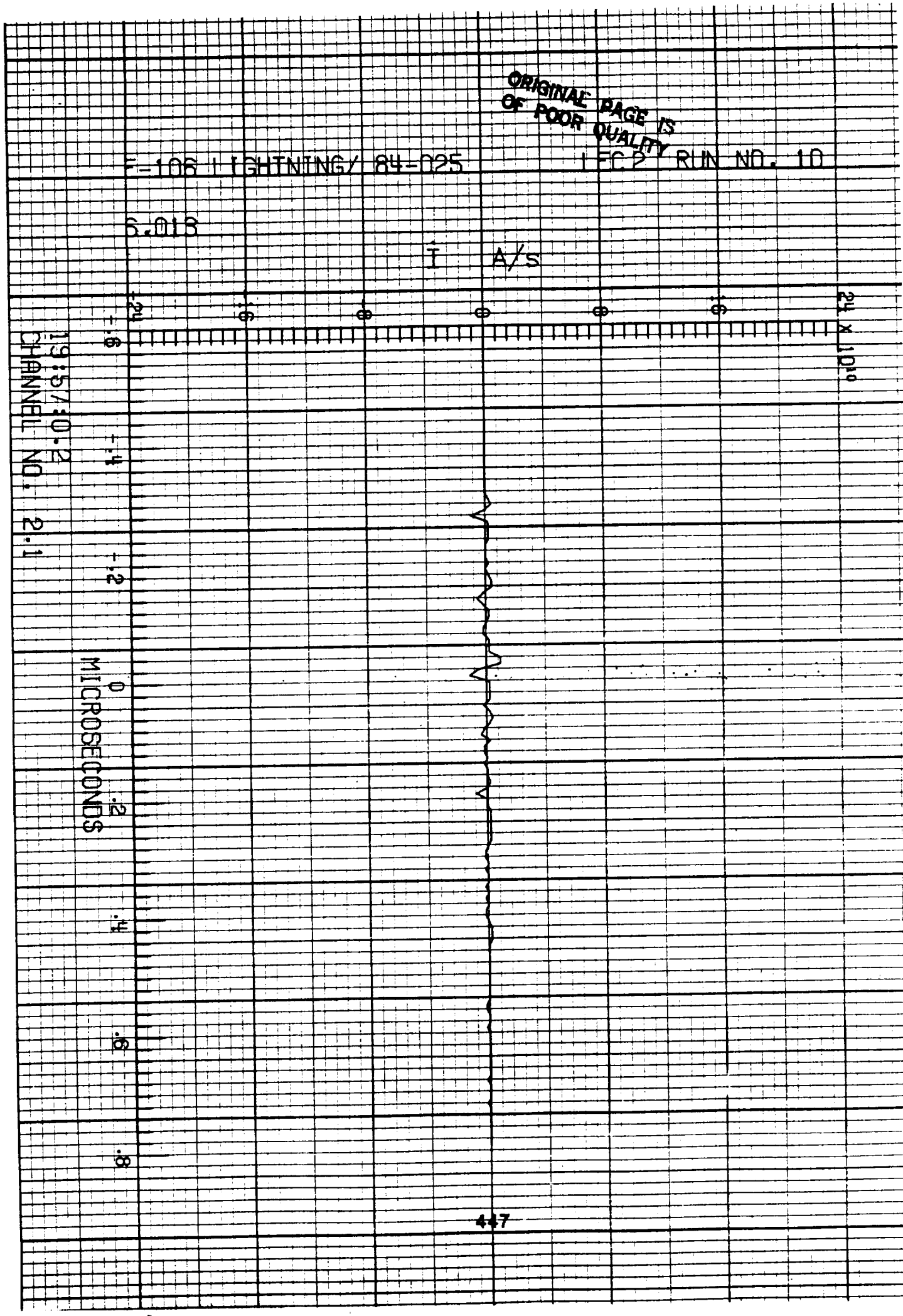
-800 -600 -400 -200 0 200 400 600 800

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2 1.4 1.6

MICROSECONDS

CHANNEL NO. 1 15:57:10.2


F-106 LIGHTNING/ 84-025 LFC 2 RUN NO. 10
6.013
$\dot{D}_i$ A/m²
-3
-2
-1
0
1
2
3
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:59:0.2
CHANNEL NO. 2.6


ORIGINAL PAGE IS
OF POOR QUALITY
F-106 LIGHTNING/ 84-025
LFC2 RUN NO. 10
6.013
I A/s
-24
-16
-8
0
8
16
24 x 10^10
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:57:0.2
CHANNEL NO. 2.1

F-106 LIGHTNING/ 84-025 LEC2 RUN NO. 10

6.013

$\dot{B}_1$ T/s

-1800 -1200 -600 0 600 1200 1800

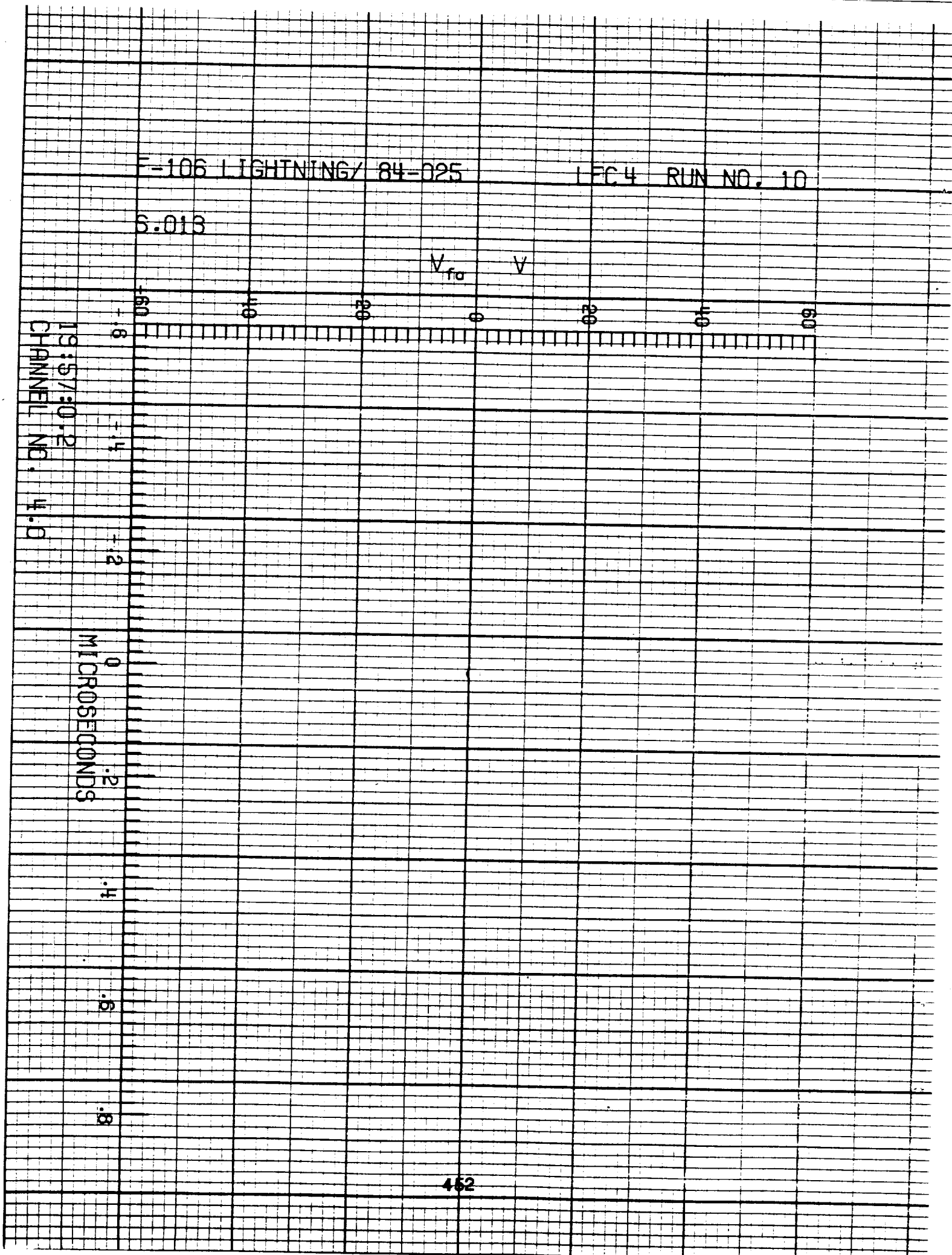
19:57:0.2

CHANNEL NO. 2.2

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

F-106 LIGHTNING/ 84-025
LFC 3 RUN NO. 10
6.013
$\dot{D}_f$ A/m^2
-1.2
-.8
-.4
0
.4
.8
1.2
-.6
-.4
-.2
0
.2
.4
.6
.8
19:57:0.2
CHANNEL NO. 8.2
MICROSECONDS


F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 10
S.013
V_{fa} V
-60
-40
-20
0
20
40
60
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:57:0.2
CHANNEL NO. 4.0

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F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 10

6.018

$\bar{D}_{wr}$ A/m^2

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19:57:0.2
CHANNEL NO. 8.0

MICROSECONDS

F-106 LIGHTNING/ 84-025 LEC3 RUN NO. 10

5.013

$\dot{D}_{wi}$ A/m^2

-18 -12 -6 0 6 12 18

-1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4

MICROSECONDS

19:57:0.2

CHANNEL NO. 3.1

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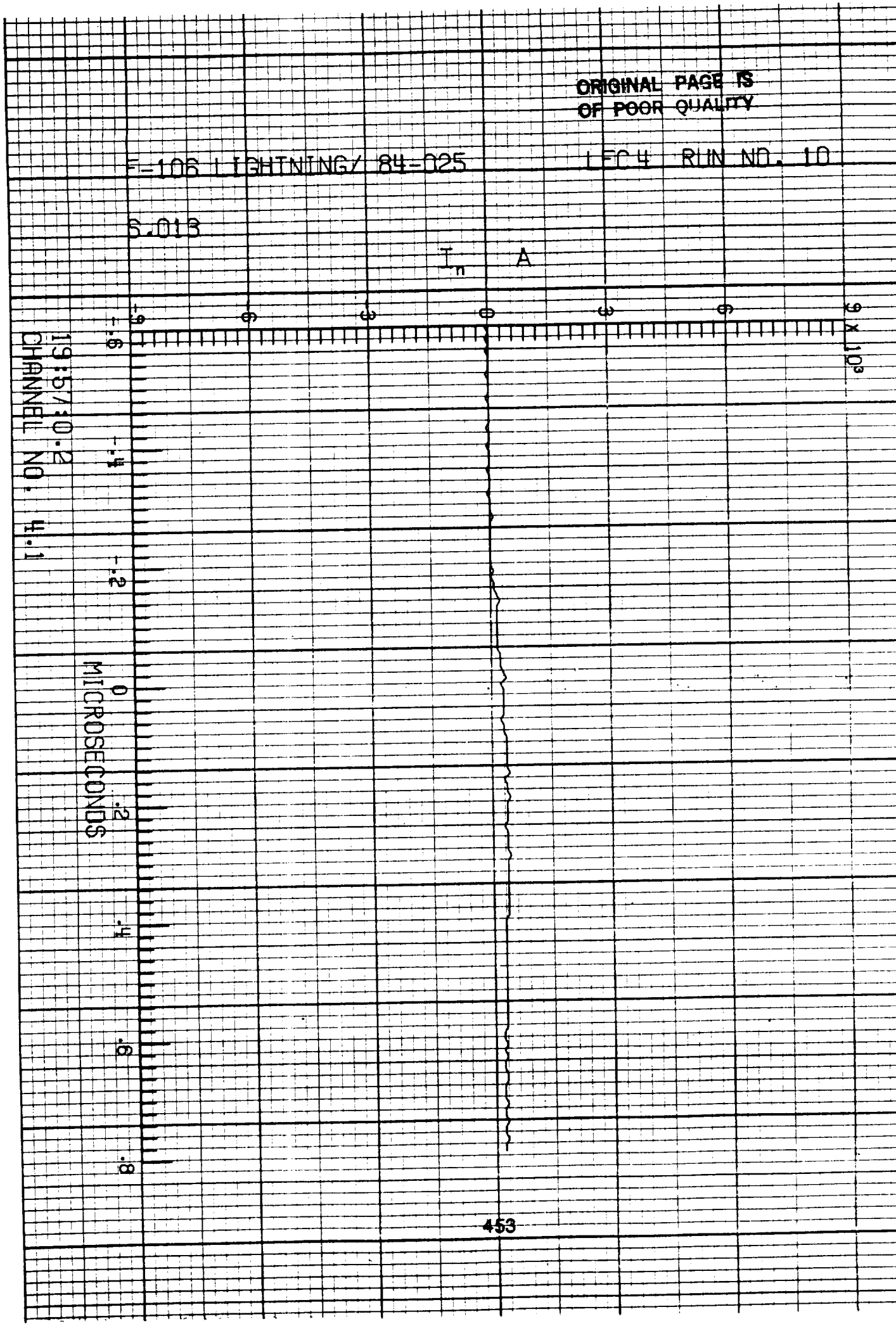

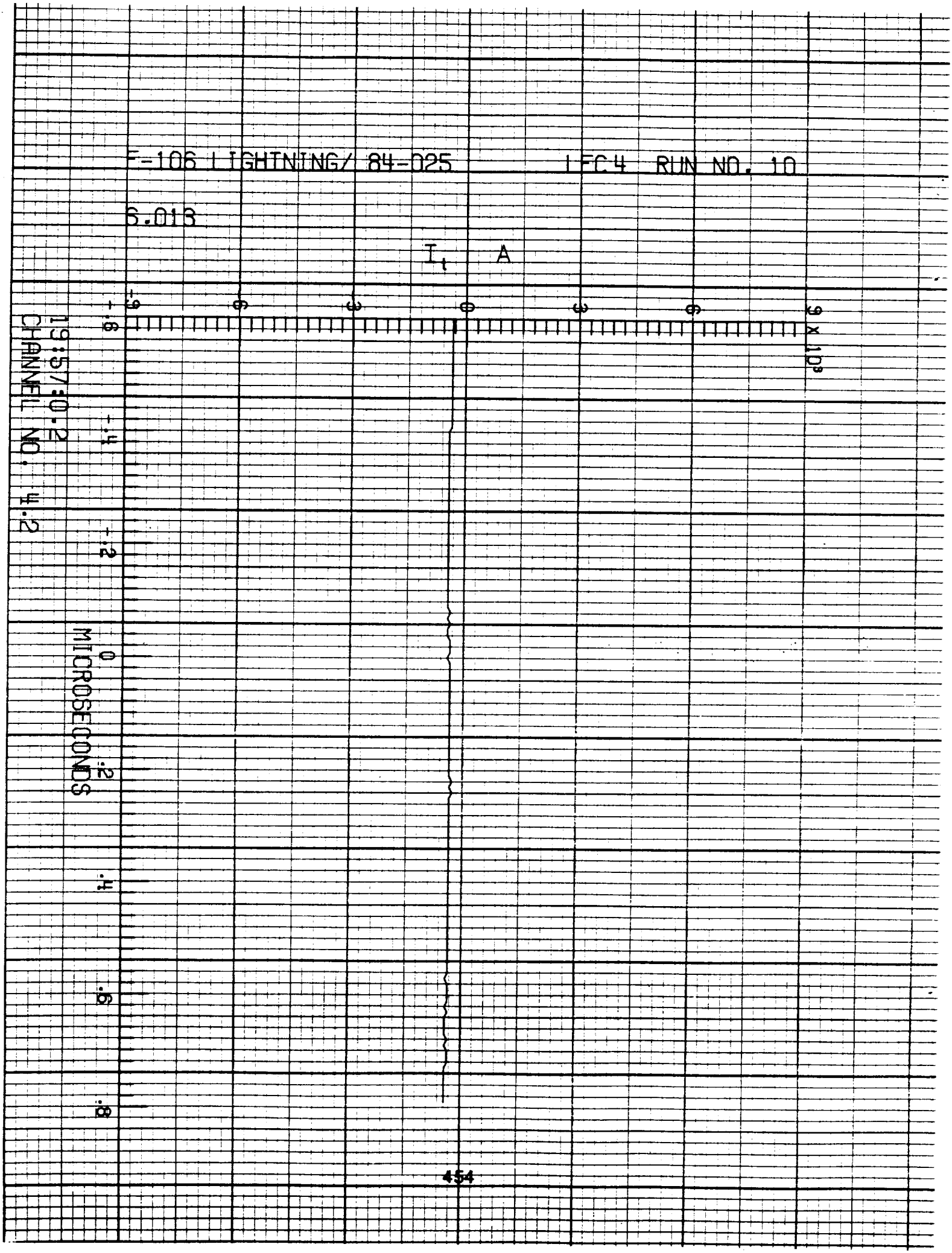
F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 10
6.013
I_t A
-9
-6
-3
0
3
6
9 x 10³
-.6
-.4
-.2
0
.2
.4
.6
.8
MICROSECONDS
19:57:0.2
CHANNEL NO. 4.2

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F-106 LIGHTNING/ 84-025 IFC1 RUN NO. 11

6.014

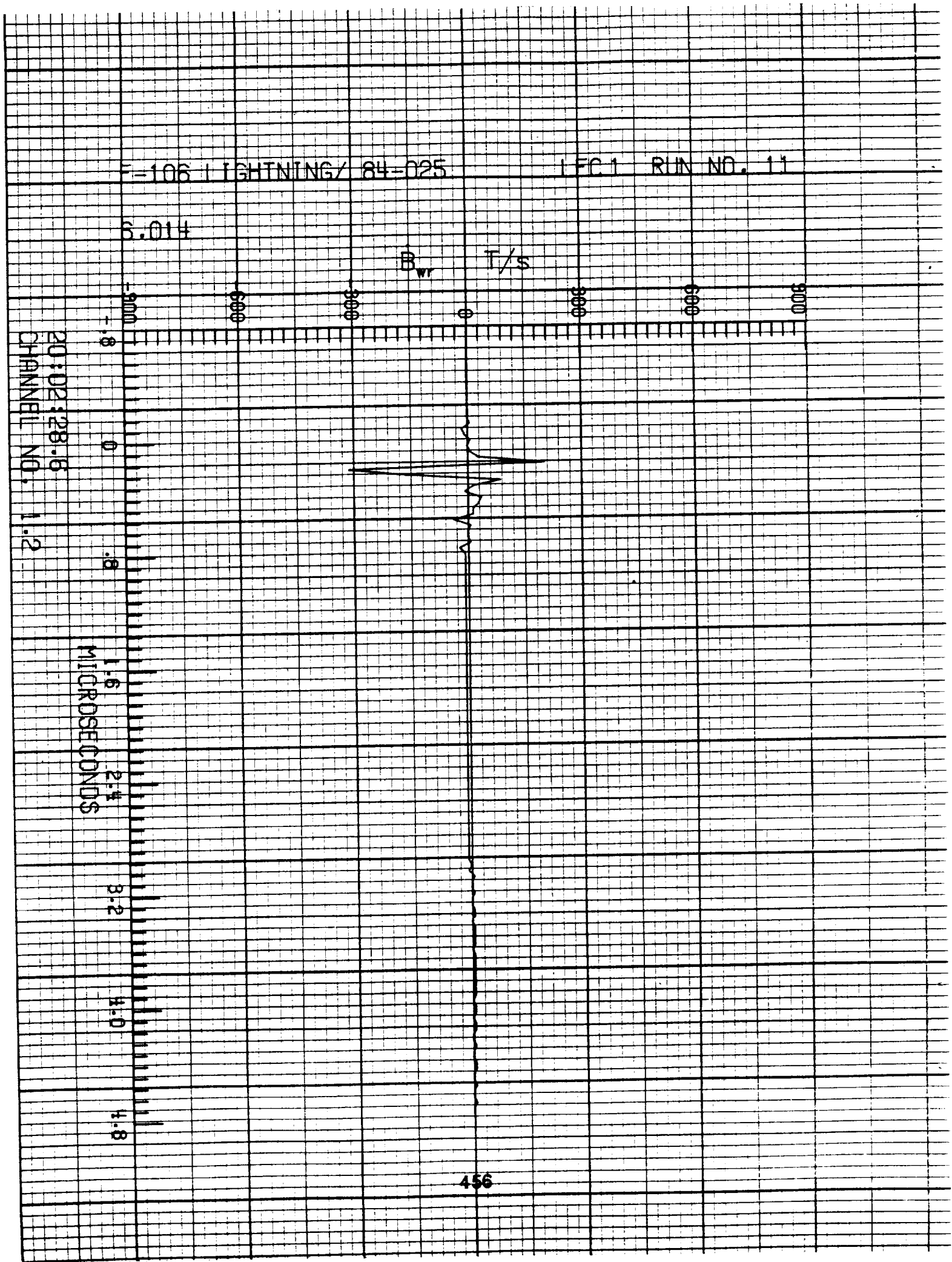
$\dot{B}_w$ T/s

-900 -600 -300 0 300 600 900

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

20:02:28.9
CHANNEL NO. 1 1 1


F=106 LIGHTNING/ 84-025
LFC1 RUN NO. 11
6.014
B_{wr} T/S
-800
-600
-400
-200
0
200
400
600
800
20:02:28.6
CHANNEL NO. 1.2
1.2
.8
0
-.8
1.6
MICROSECONDS
2.4
3.2
4.0
4.8

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC2 RUN NO. 11

5.014

$\dot{D}_t$ A/m^2

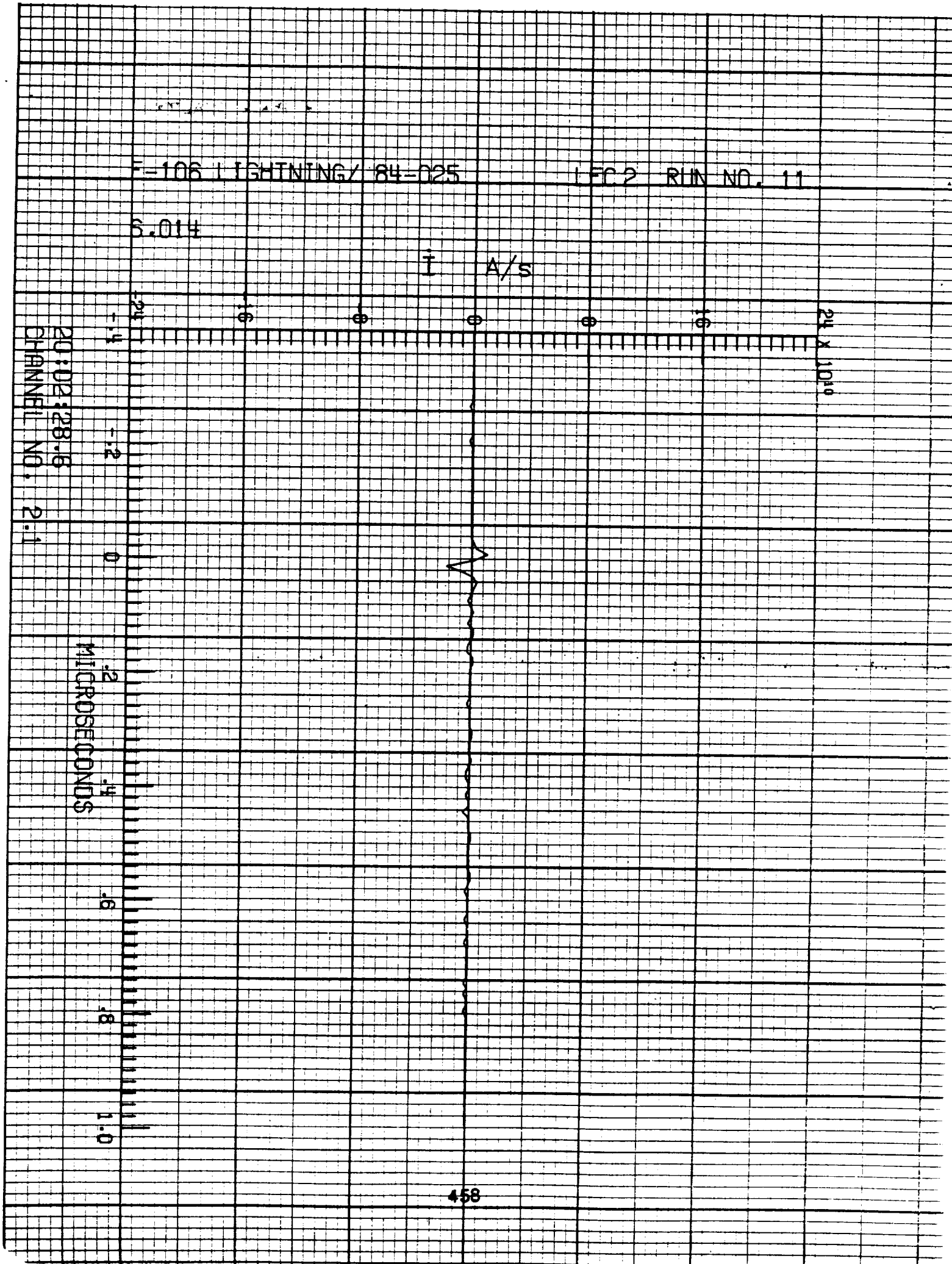
-3 -2 -1 0 1 2 3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:02:28.6

CHANNEL NO. 2-D


F-106 LIGHTNING/ 84-025
LFC 2 RUN NO. 11
6.014
İ A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:02:28.6
CHANNEL NO. 2.1

ORIGINAL PAGE IS
OF POOR QUALITY

T-106 LIGHTNING/ 84-025 LEC2 RUN NO. 11

6.01#

$\dot{B}_1$ T/s

-1800 -1200 -600 0 600 1200 1800

-.4 -.2 0 .2 .4 .6 .8 1.0

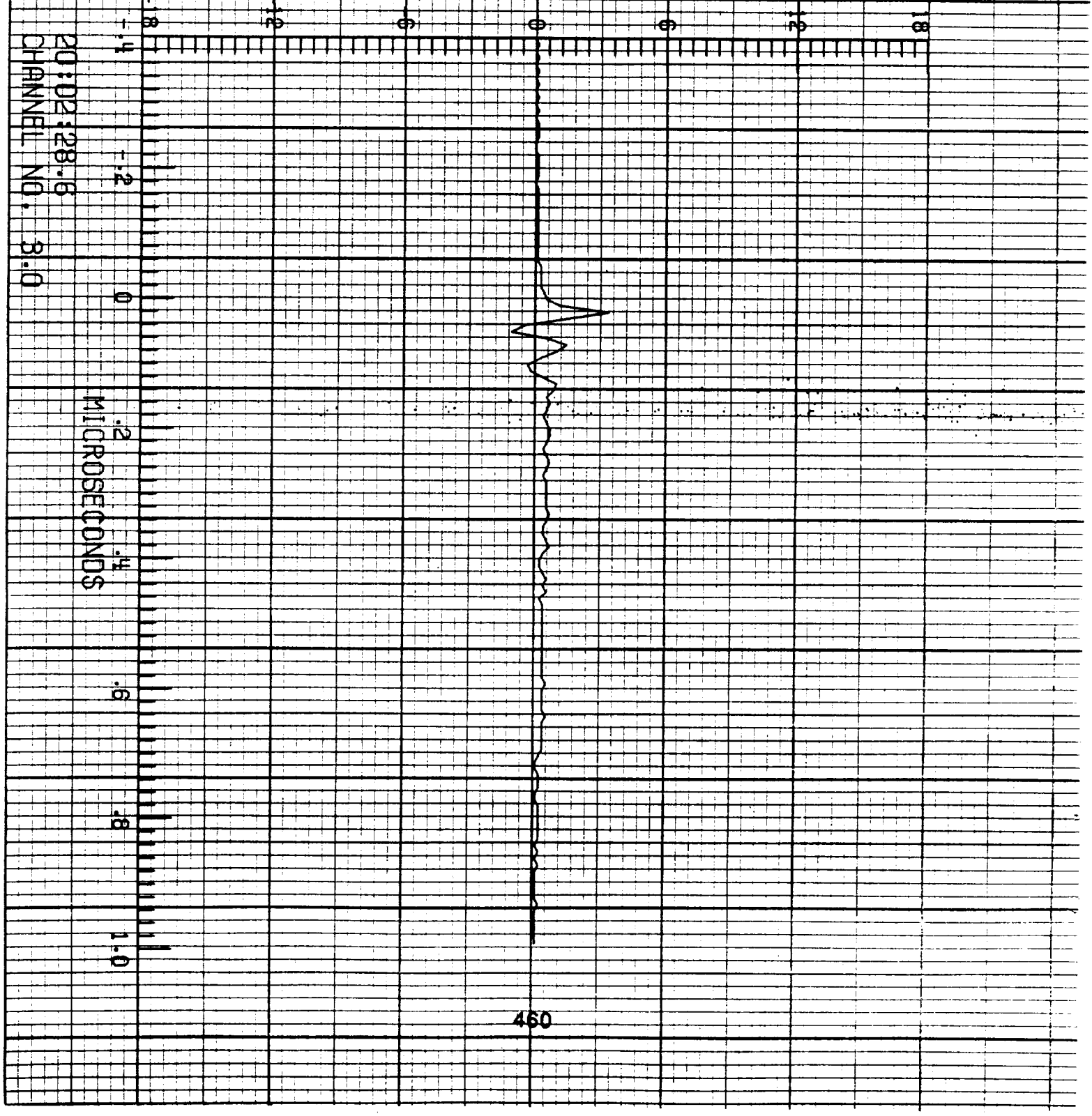
MICROSECONDS

20:02:28.6
CHANNEL NO. 2.2

F-106 LIGHTNING/ 84-025 LFC 3 RUN NO. 11

6.014

$\dot{D}_{wr}$ A/m^2



ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 11

6.014

$\dot{D}_{wi}$ A/m^2

+18 +12 +6 0 -6 -12 -18

20:02:28.6
CHANNEL NO. 3.1

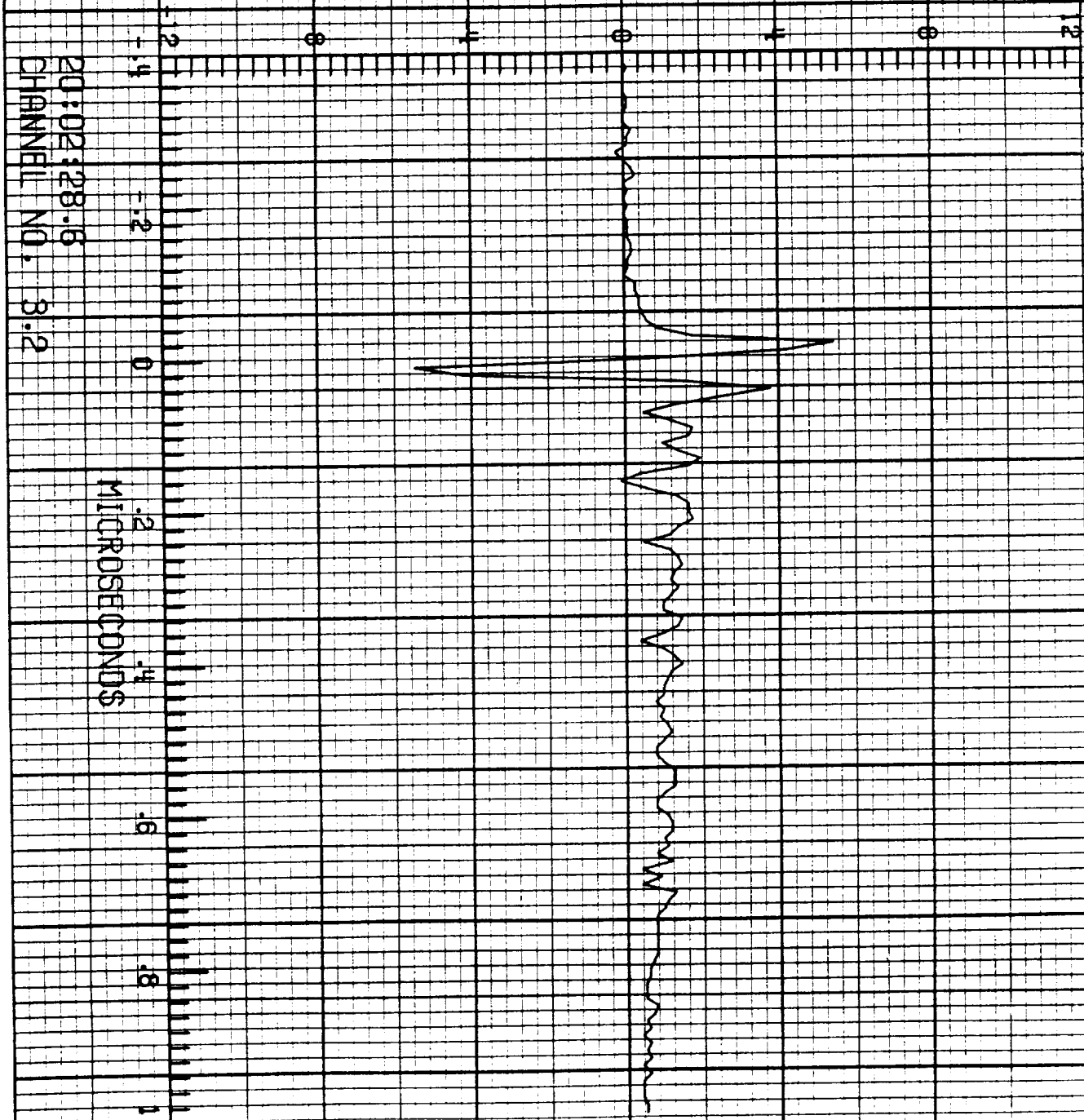
+.4 +.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

F-106 LIGHTNING/ 84-025 IFC 3 RUN NO. 11

6.014

D_f A/m^2



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F-106 LIGHTNING/ 84-025 LFC 4. RUN NO. 11

5.01#

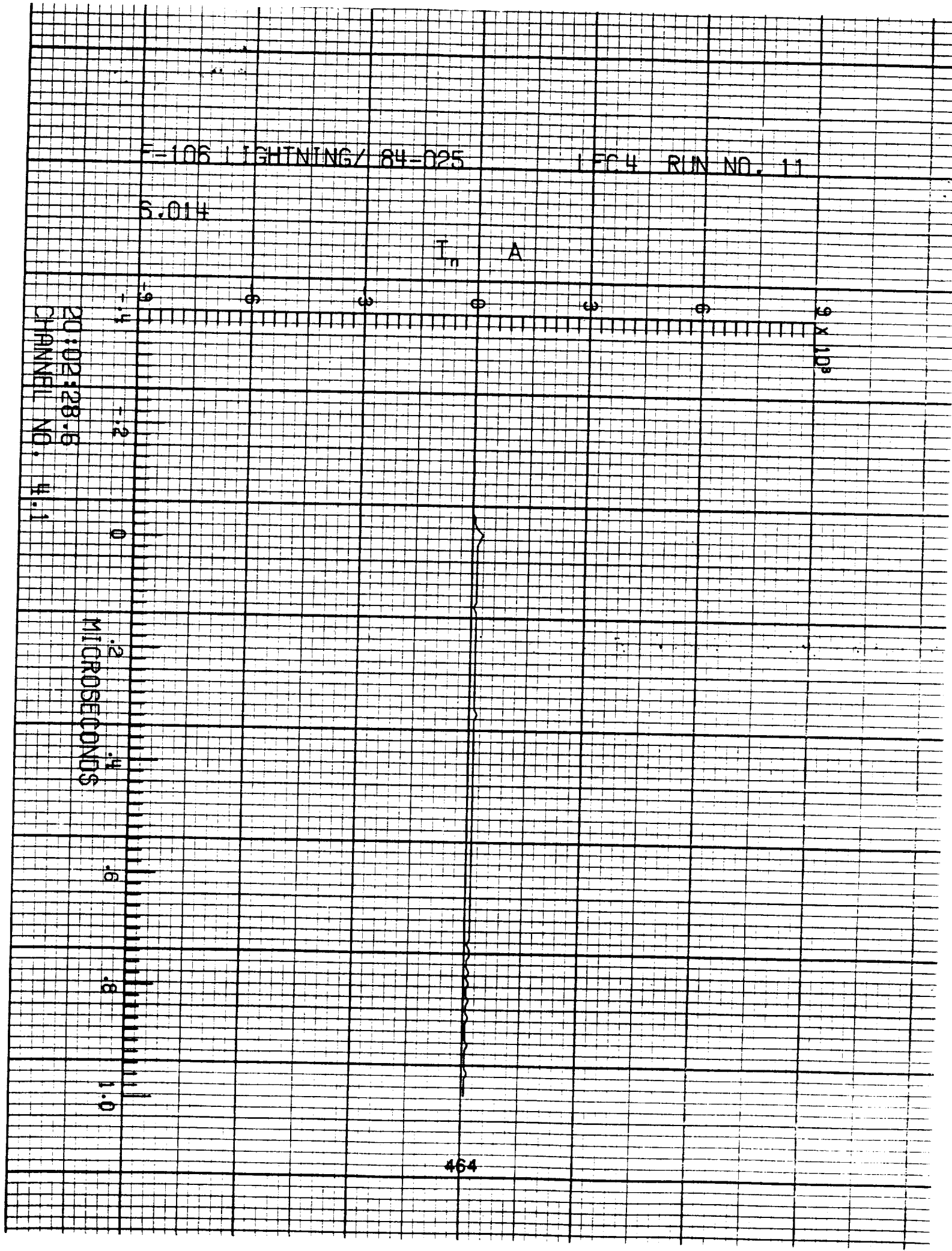
V_{fa} V

-60 -40 -20 0 20 40 60

20:02:28.6
CHANNEL NO. #1

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS


F-106 LIGHTNING/ 84-025
LEC4 RUN NO. 11
6.014
I_n A
-9
-6
-3
0
3
6
9 x 10^8
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:02:28.6
CHANNEL NO. 4.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LFC4 RUN NO. 11

6.014

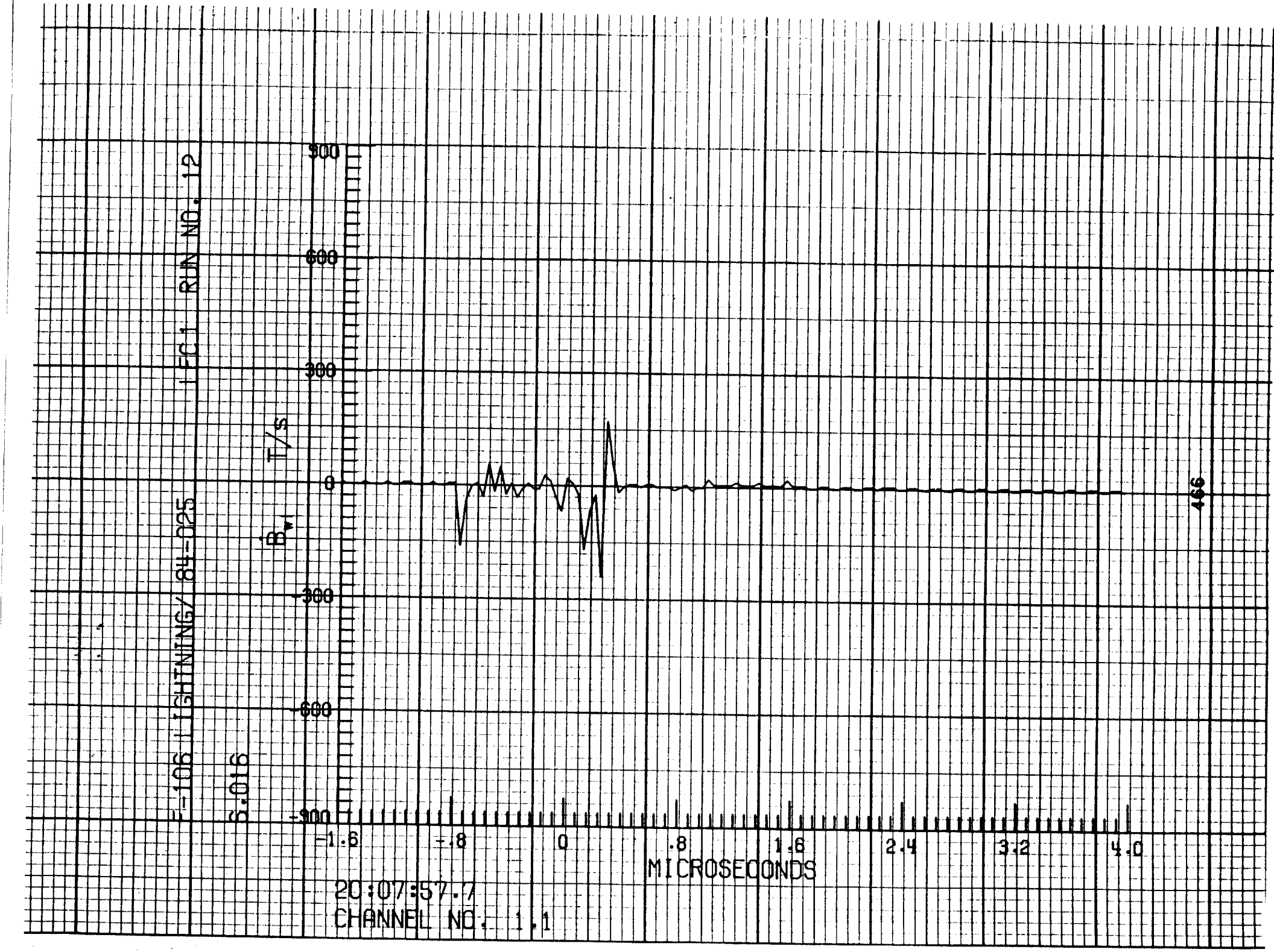
I_t A

-5 0 5 10 15 20 x 10^3

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:02:28.6
CHANNEL NO. 4.2


900
600
300
0
-300
-600
-900
T/S
-Bφ
466
-1.6
-.8
0
.8
1.6
2.4
3.2
4.0
MICROSECONDS
E=106 # LIGHTNING/ 84-025 # FC.1 RUN NO. 12
6.016
20:07:57.7
CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LFC 1 RUN NO. 12

6.016

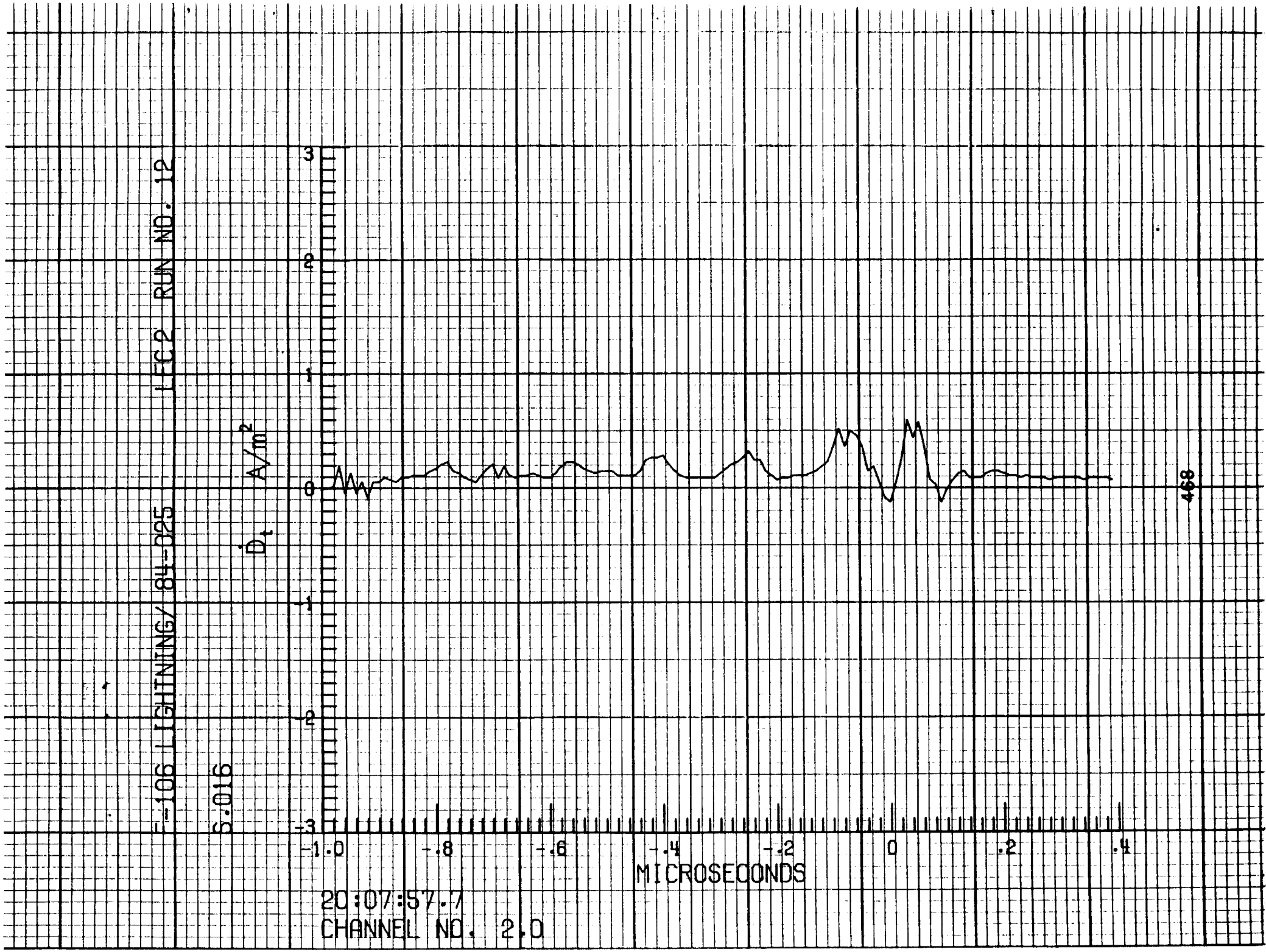
B_{wr} T/s

-800 -600 -400 0 400 600 800

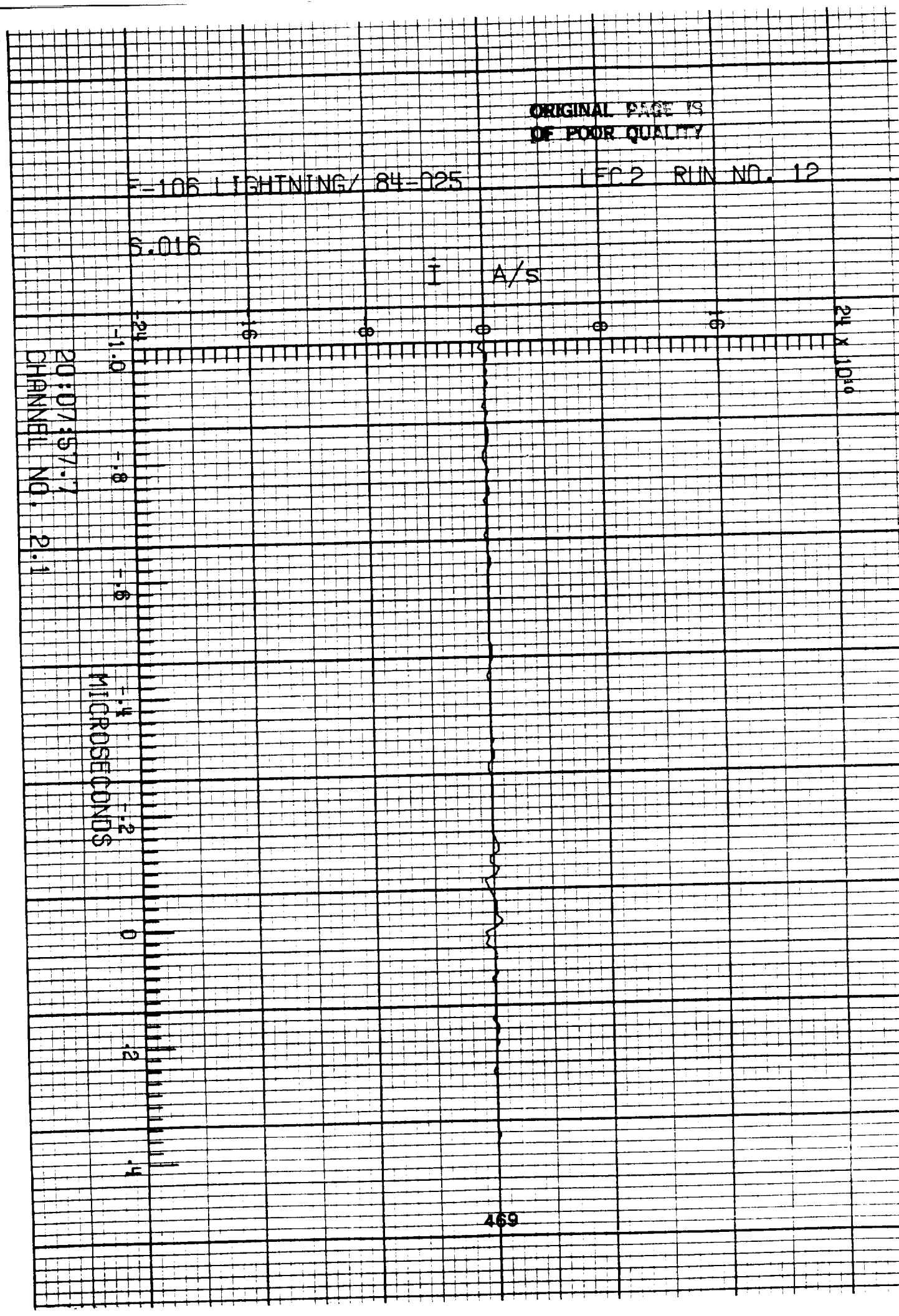
-1.6 -.8 0 .8 1.6 2.4 3.2 4.0

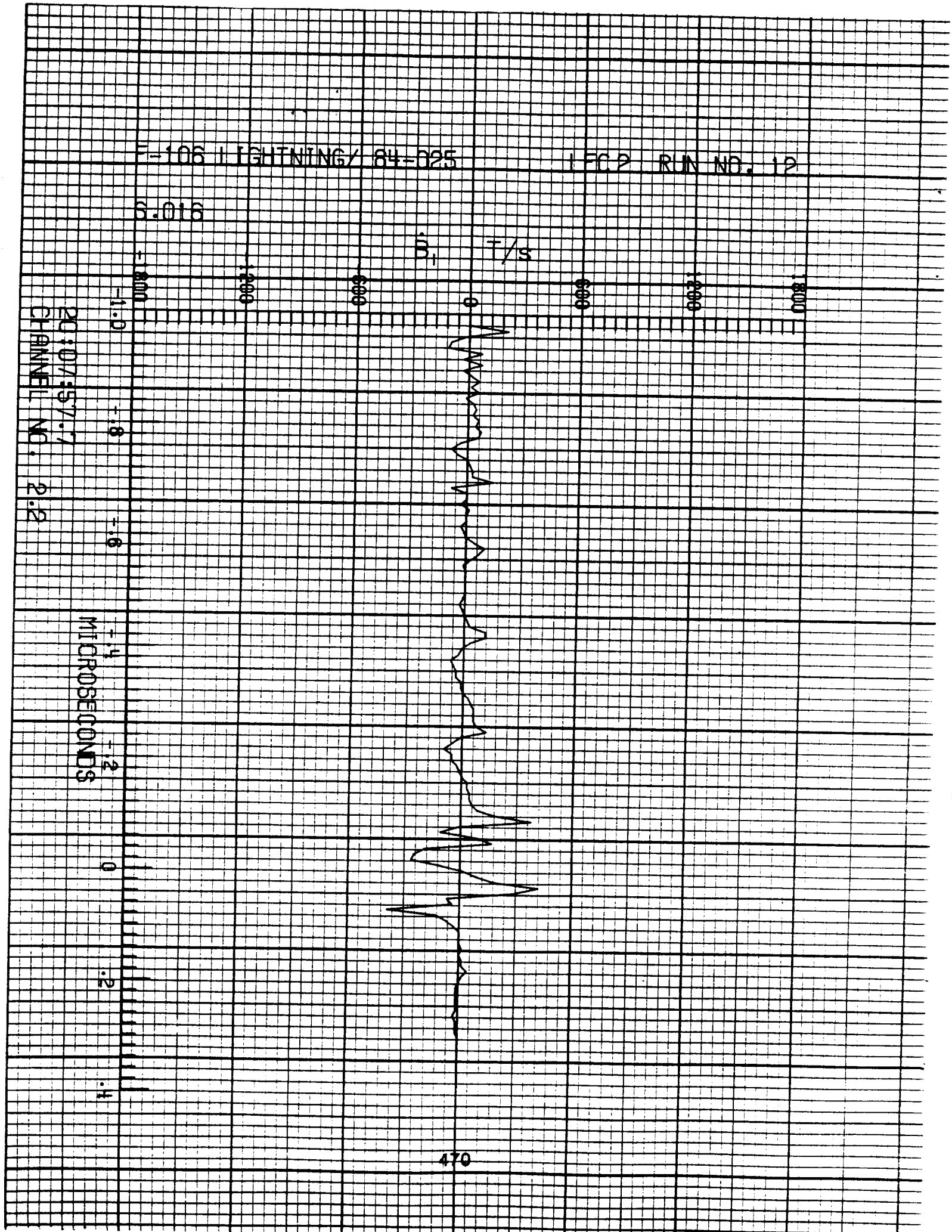
MICROSECONDS

20:07:57.7
CHANNEL NO. 1.2


F-106 LIGHTNING/ 84-025 LEC 2 RUN NO. 12
5.016
D_t A/m^2
3
2
1
0
-1
-2
-3
-1.0
-.8
-.6
-.4
-.2
0
.2
.4
MICROSECONDS
468
20:07:57.7
CHANNEL NO. 2.0

ORIGINAL PAGE IS
OF POOR QUALITY




F-106 LIGHTNING/ 84-025
LFC2 RUN NO. 12
6.016
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-1.0
-.8
-.6
-.4
-.2
0
.2
.4
MICROSECONDS
20:07:57.7
CHANNEL NO. 2.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LFC3 RUN NO. 12

6.016

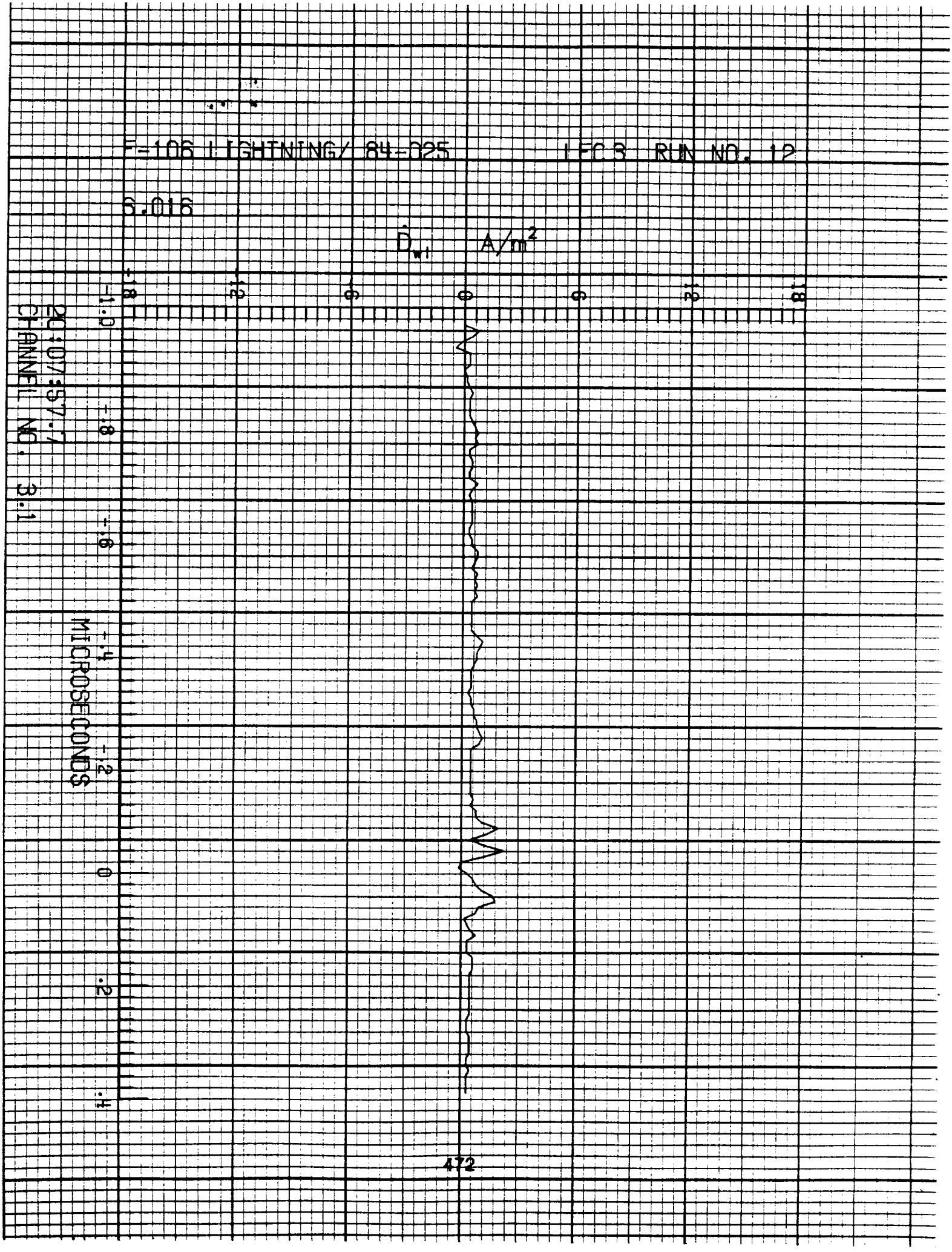
$\dot{D}_{wr}$ A/m^2

+18 +12 +6 0 -6 -12 -18

-1.0 +.8 +.6 +.4 +.2 0 -.2 -.4

MICROSECONDS

20:07:57.7
CHANNEL NO. 3.0


F-106 LIGHTNING/ 84-025
LEC 3 RUN NO. 12
6.016
$\dot{D}_{wl}$ A/m^2
-18
-12
-6
0
6
12
18
-1.0
-.8
-.6
-.4
-.2
0
.2
.4
MICROSECONDS
20:07:57.7
CHANNEL NO. 3.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC3 RUN NO. 12

6.016

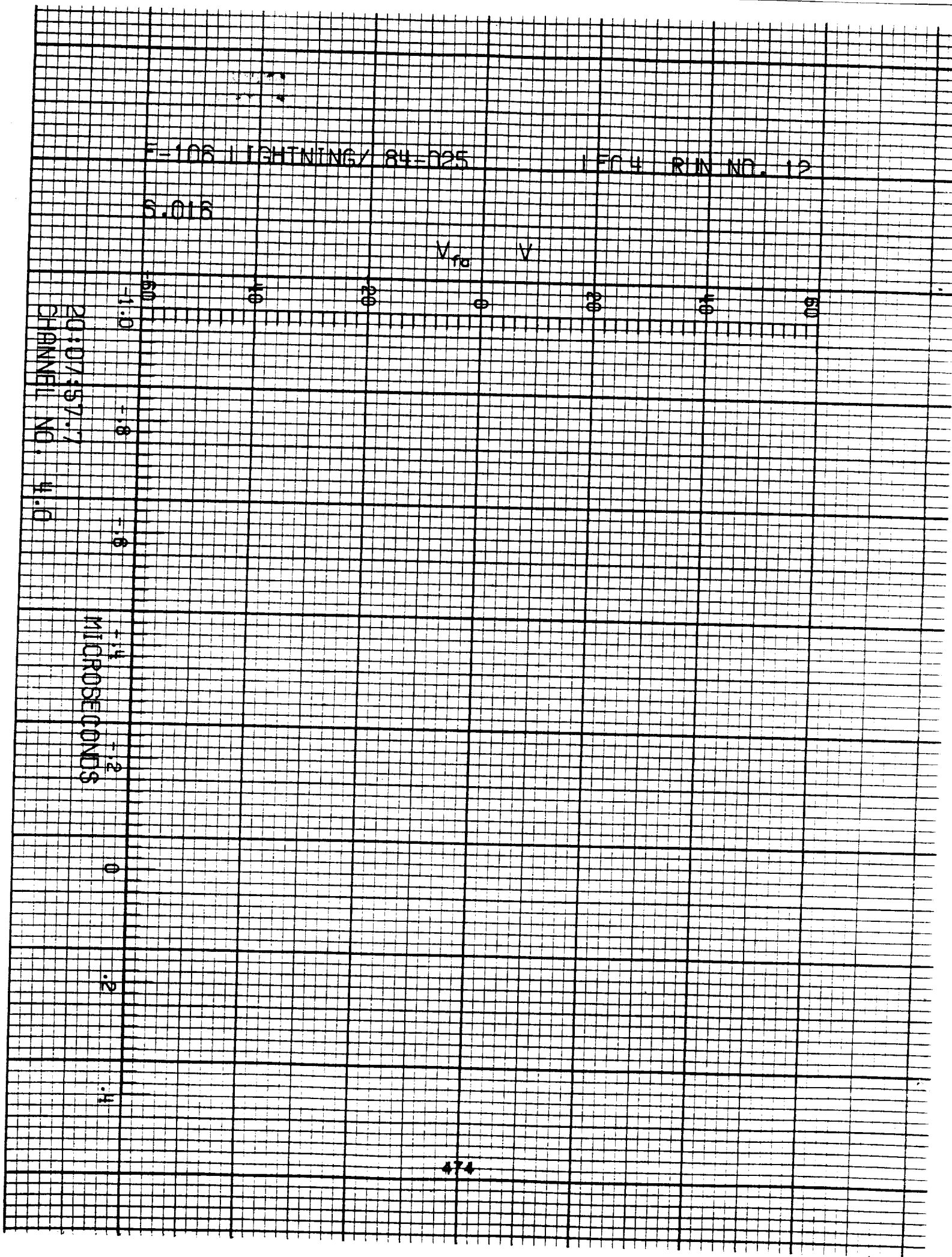
$\dot{D}_f$ A/m^2

+12 +8 +4 0 +4 +8 +12

MICROSECONDS

+4 +2 0 -2 -4 -6 -8 -10 -12

2C:07:57:7
CHANNEL NO. 3:2


F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 12
6.016
V_{fa} V
-80
-40
0
40
80
-1.0
-.8
-.6
-.4
-.2
0
.2
.4
MICROSECONDS
20:07:57.7
CHANNEL NO. 1
Dif #0

ORIGINAL PAGE IS
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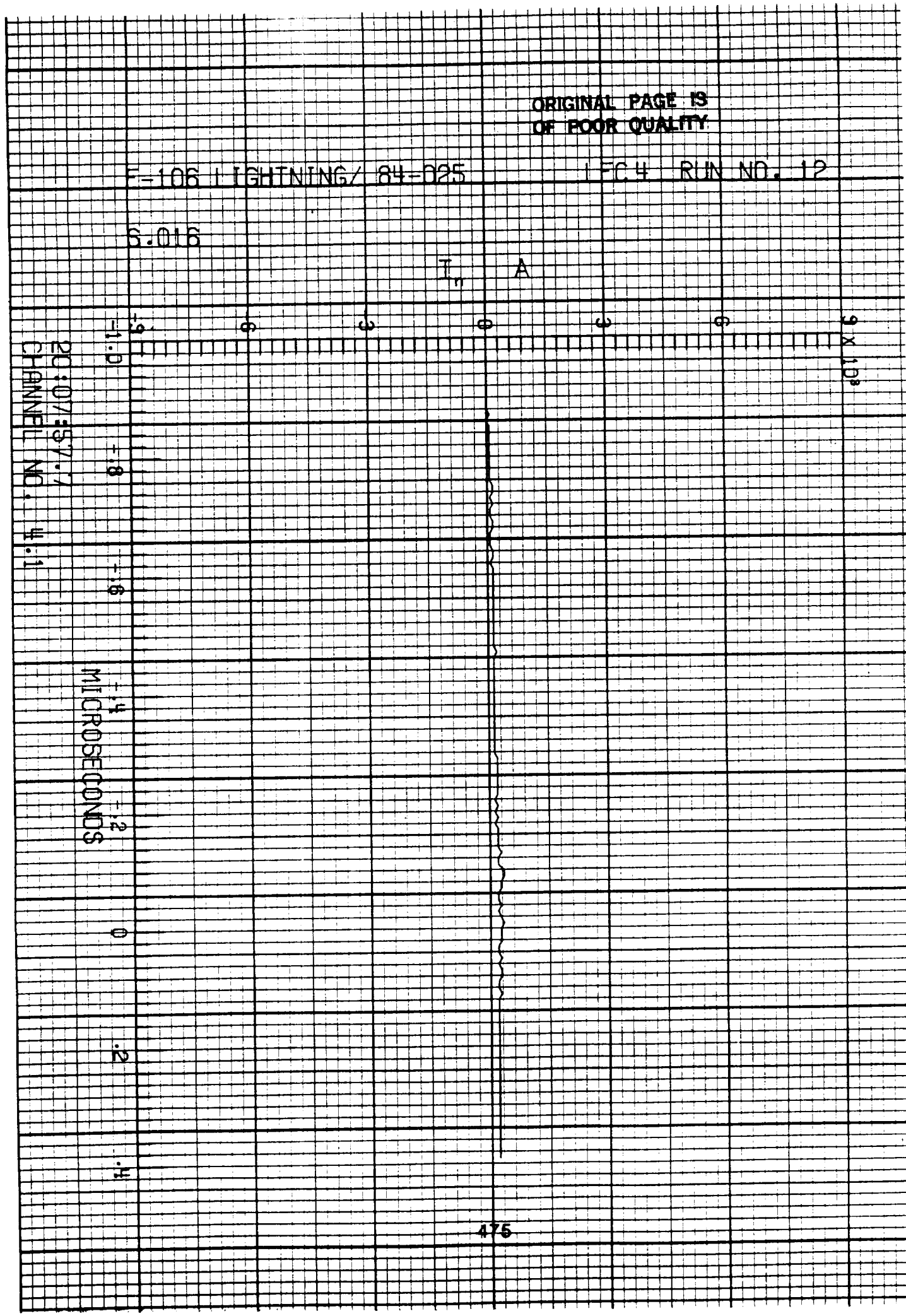
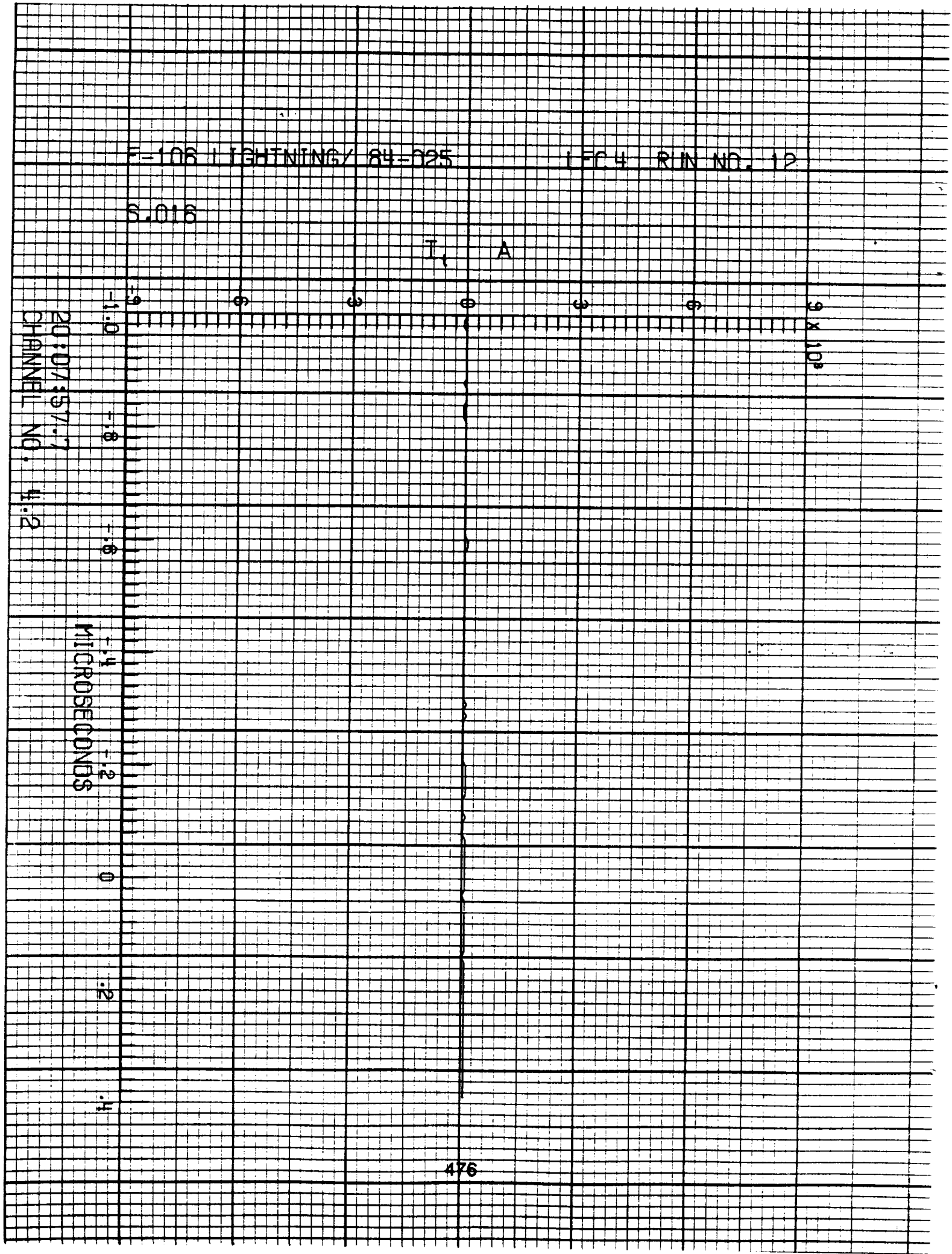



F-106 LIGHTNING/ 84-025
LFC4 RUN NO. 12
S.016
I_t A
-9
-6
-3
0
3
6
9 x 10³
-1.0
-.8
-.6
-.4
-.2
0
.2
.4
MICROSECONDS
20:07:57.7
CHANNEL NO. 4.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LFC1 RUN NO. 13

6.017

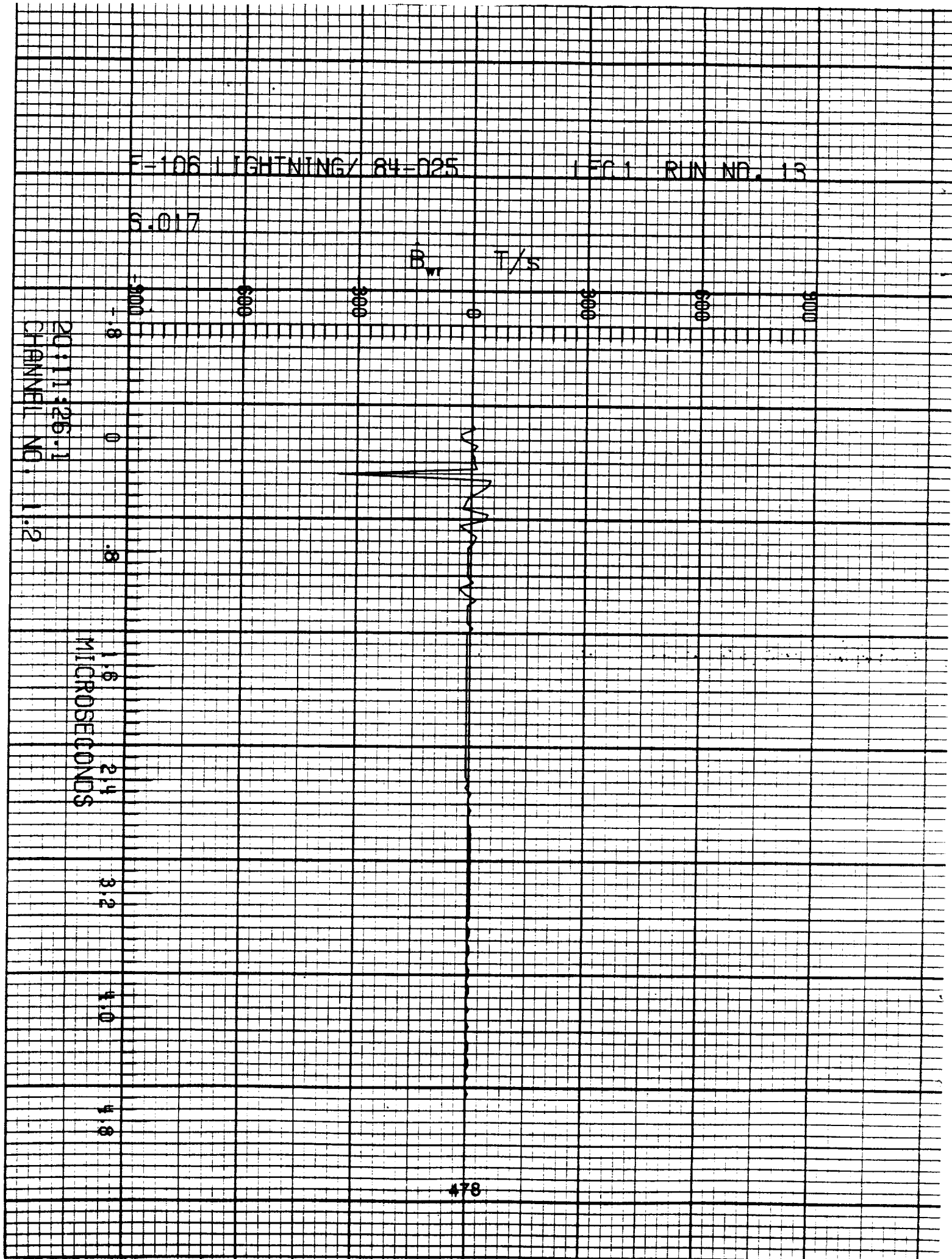
$\dot{B}_{wi}$ T/S

-800 -600 -400 -200 0 200 400 600

20:11:26.1
CHANNEL NO. 1.1

1.8 1.6 1.4 1.2 1.0 .8 .6 .4 .2 0

MICROSECONDS


F-106 LIGHTNING/ 84-025
LEC 1 RUN NO. 13
6.017
$\dot{B}_{wr}$ T/s
-900
-600
-300
0
300
600
900
20:11:26.1
CHANNEL NO. 1.2
-.8
0
.8
1.6
2.4
3.2
4.0
4.8
MICROSECONDS

ORIGINAL PAGE IS
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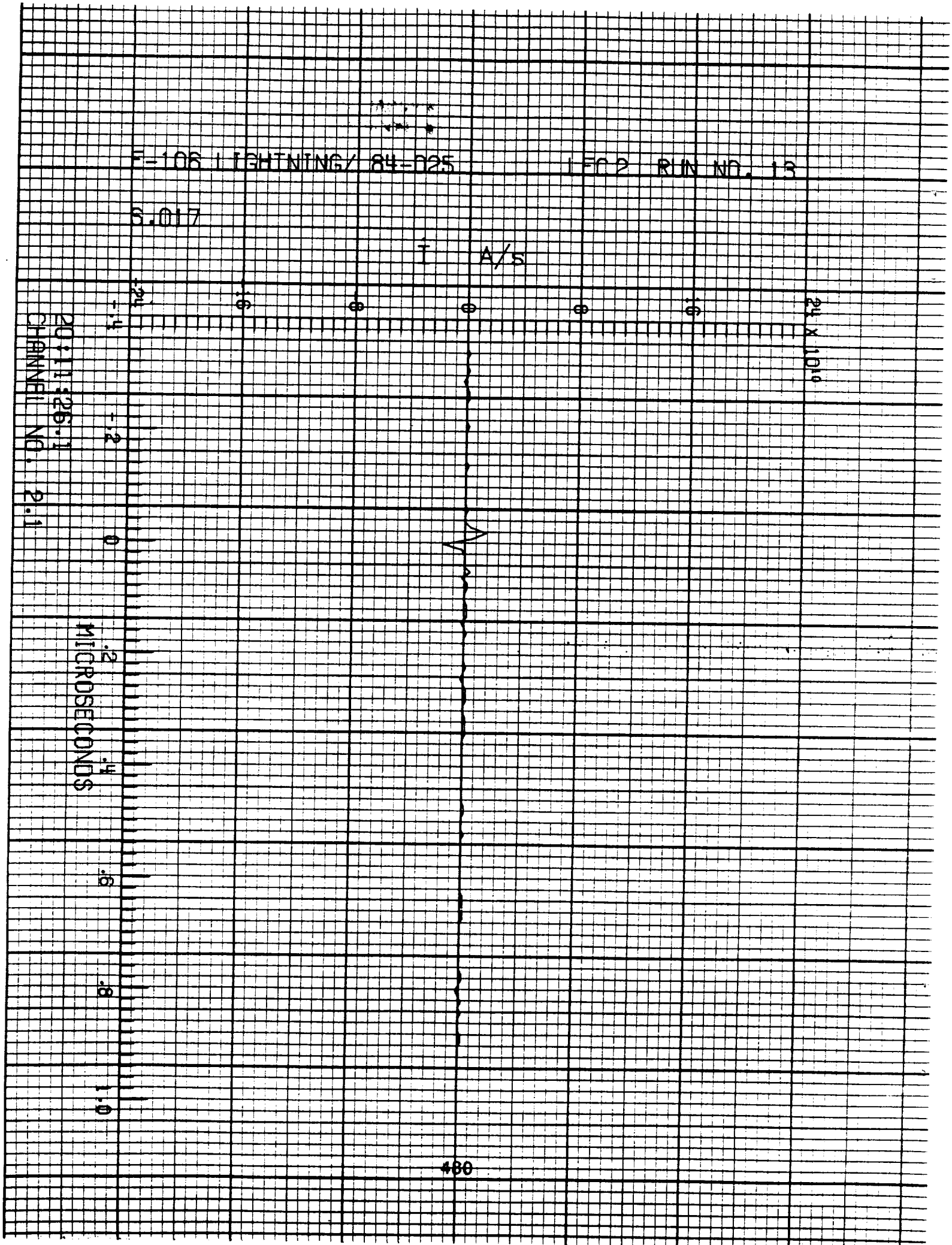
F-106 LIGHTNING/ 84-025 LEC 2 RUN NO. 13

S.017

D_t A/m^2

20:11:26:1
CHANNEL NO. 2.0

MICROSECONDS


F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 13
6.017
Ī A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:11:26.1
CHANNEL NO. 2.1

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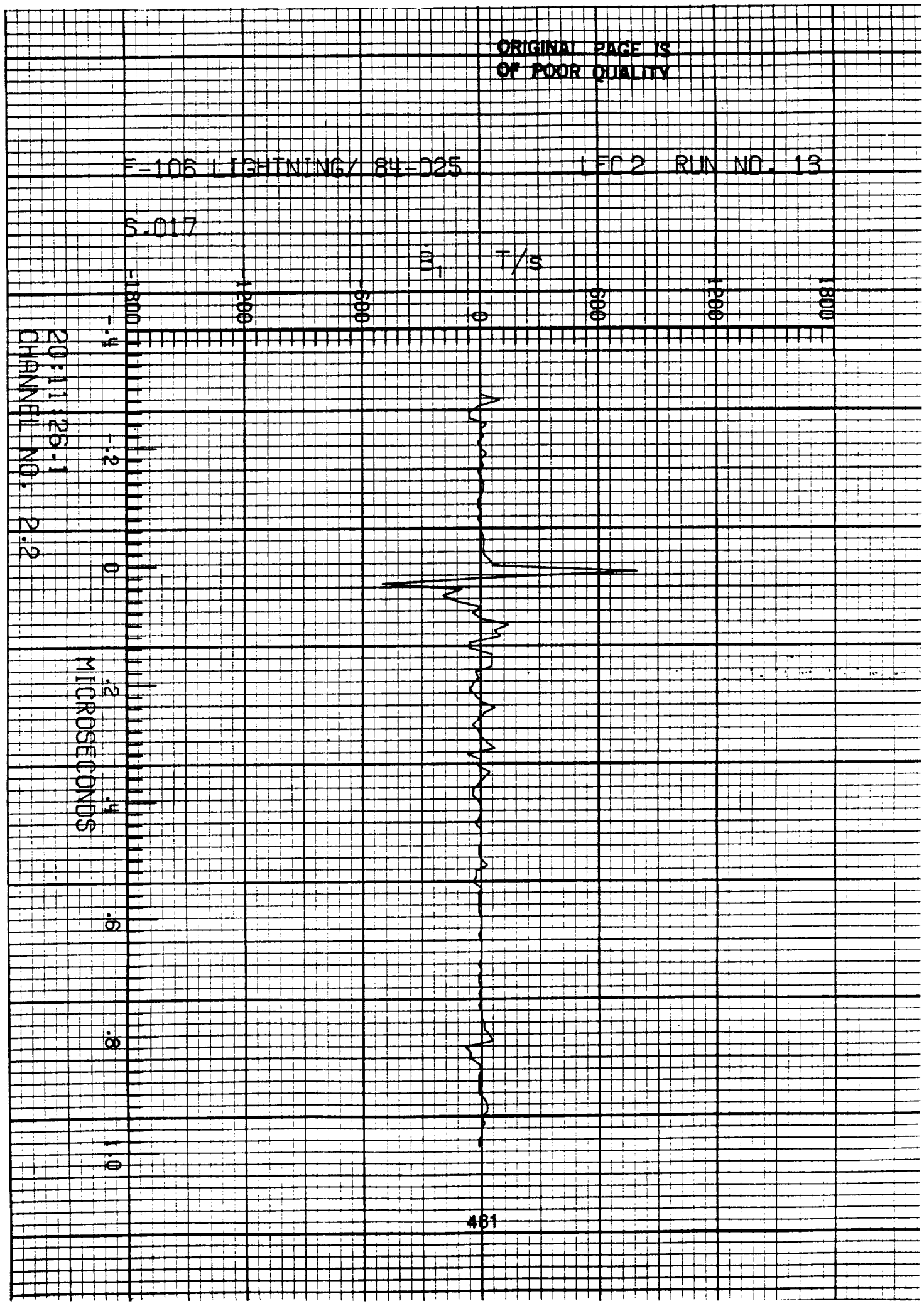

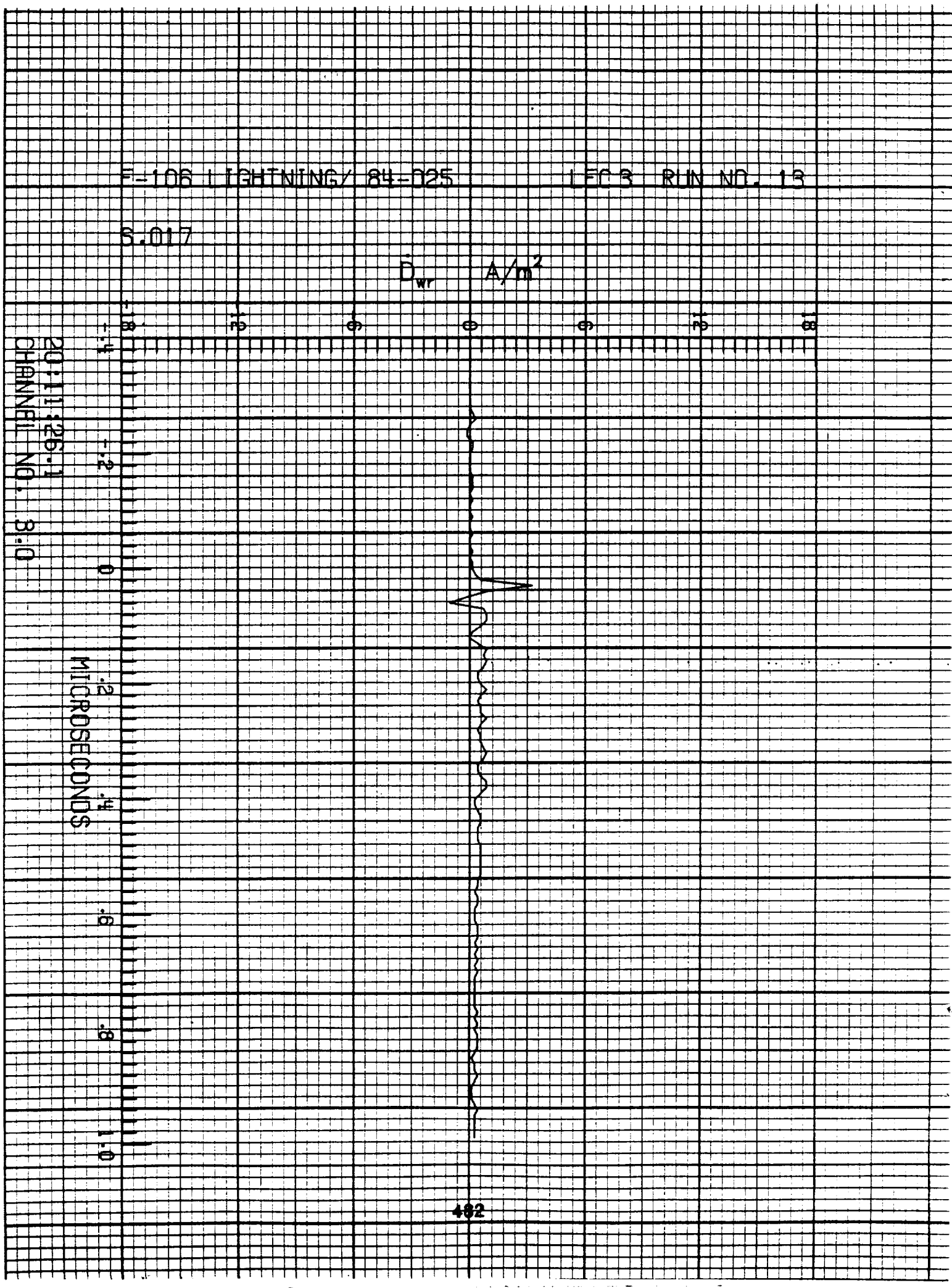
F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 13
6.017
$\dot{D}_{wr}$ A/m²
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:11:26.1
CHANNEL NO. 8.0

ORIGINAL PAGE IS
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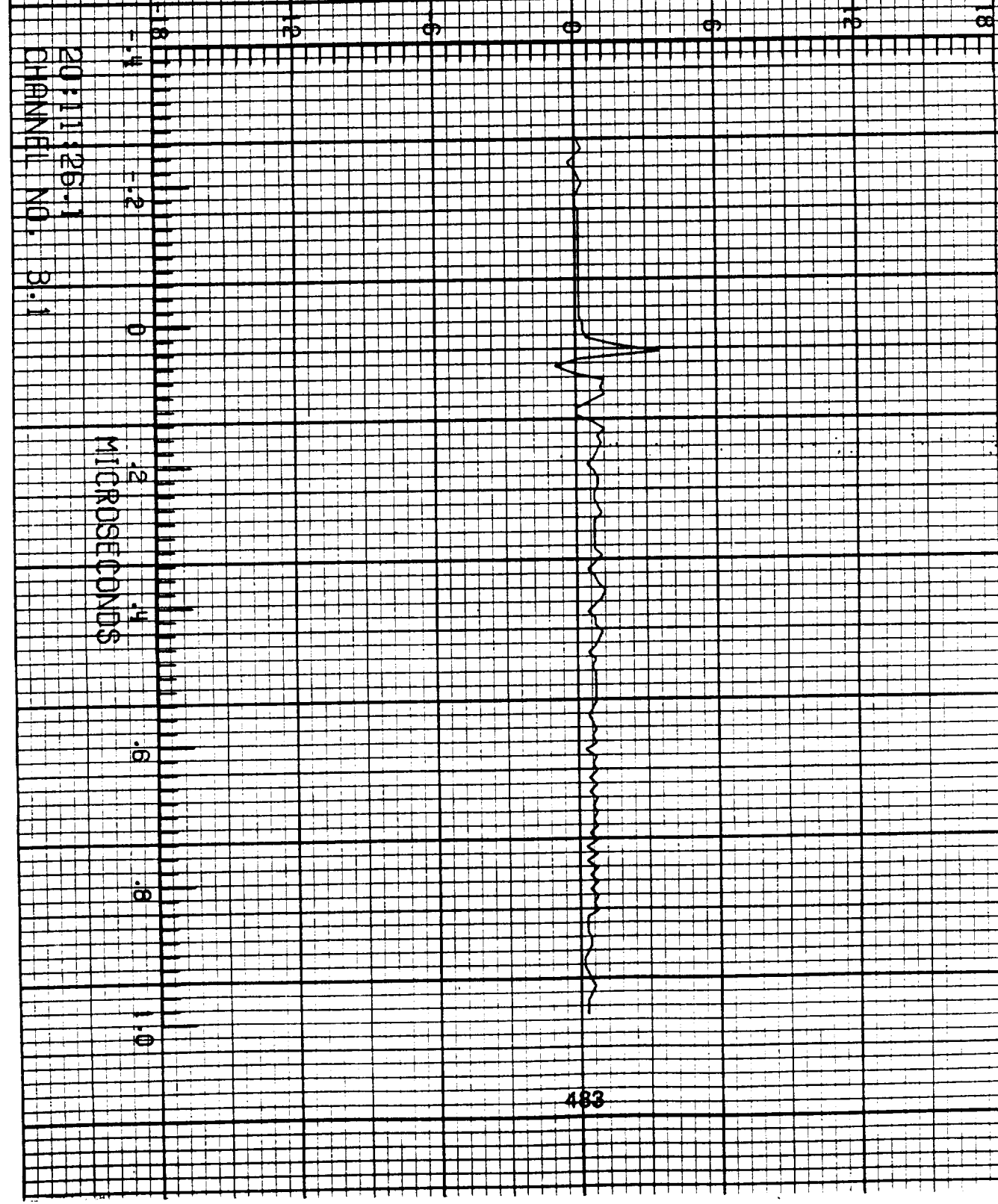
F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 13

S-017

$\dot{D}_{w1}$ A/m^2



ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 13

6.017

D_f A/m^2

-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:11:26.1
CHANNEL NO. 8.2

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 LEC 4 RUN NO. 13

S-017

V_{fa} V

-60 -40 -20 0 20 40 60

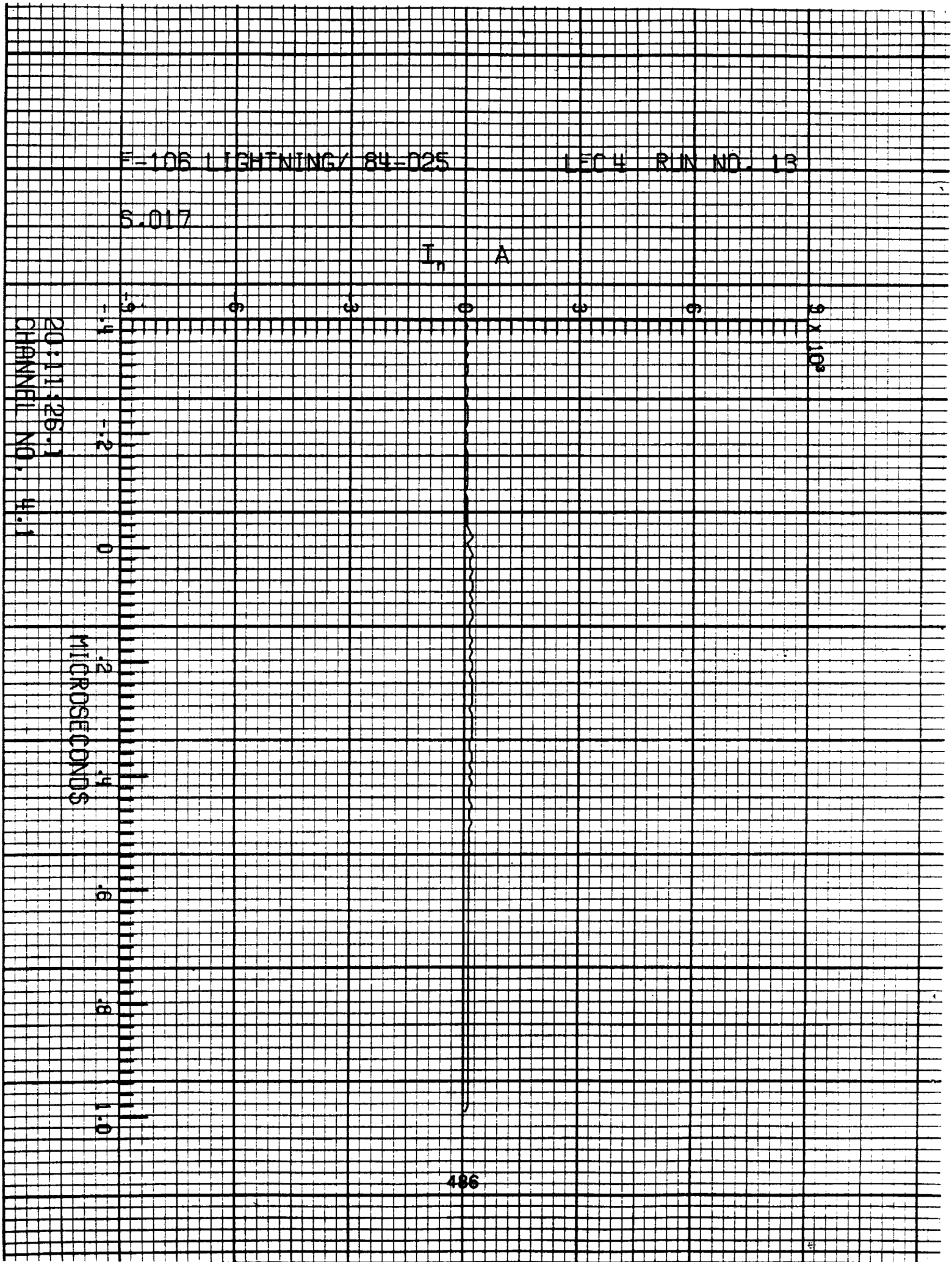
-.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

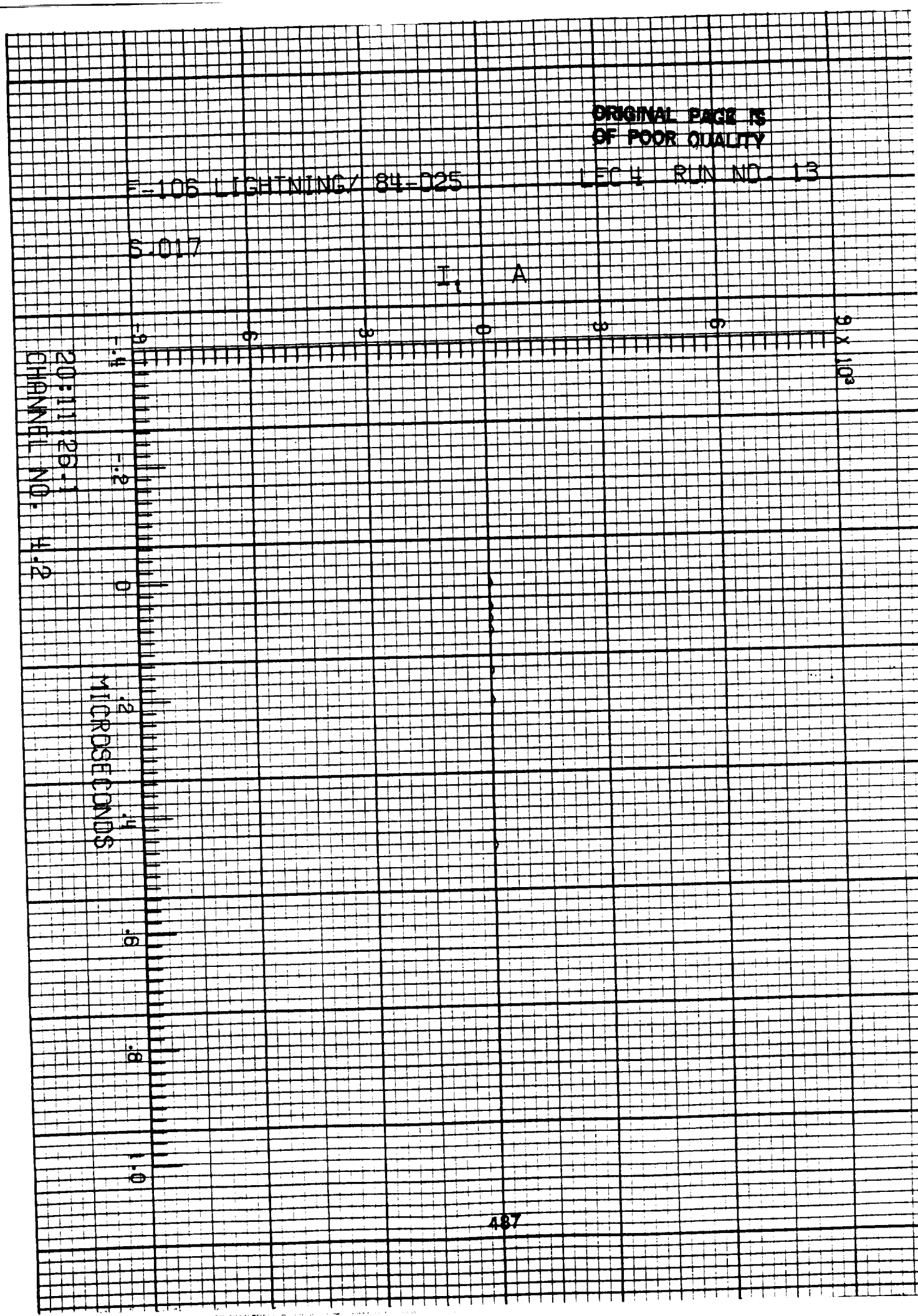
20:11:26.1

CHANNEL NO. R.O

R.O


F-106 LIGHTNING/ 84-025
LEC 4 RUN NO. 13
S.017
I_n A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:11:26.1
CHANNEL NO. 4.1

ORIGINAL PAGE IS
OF POOR QUALITY



E-106 LIGHTNING/ 84-025 LEC 1 RUN NO 14

S-018

$\dot{B}_w$ T/s

-800 -600 -400 -200 0 200 400 600 800

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

20:16:58.5

CHANNEL NO. 1.1

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC 1 RUN NO. 14

S.018

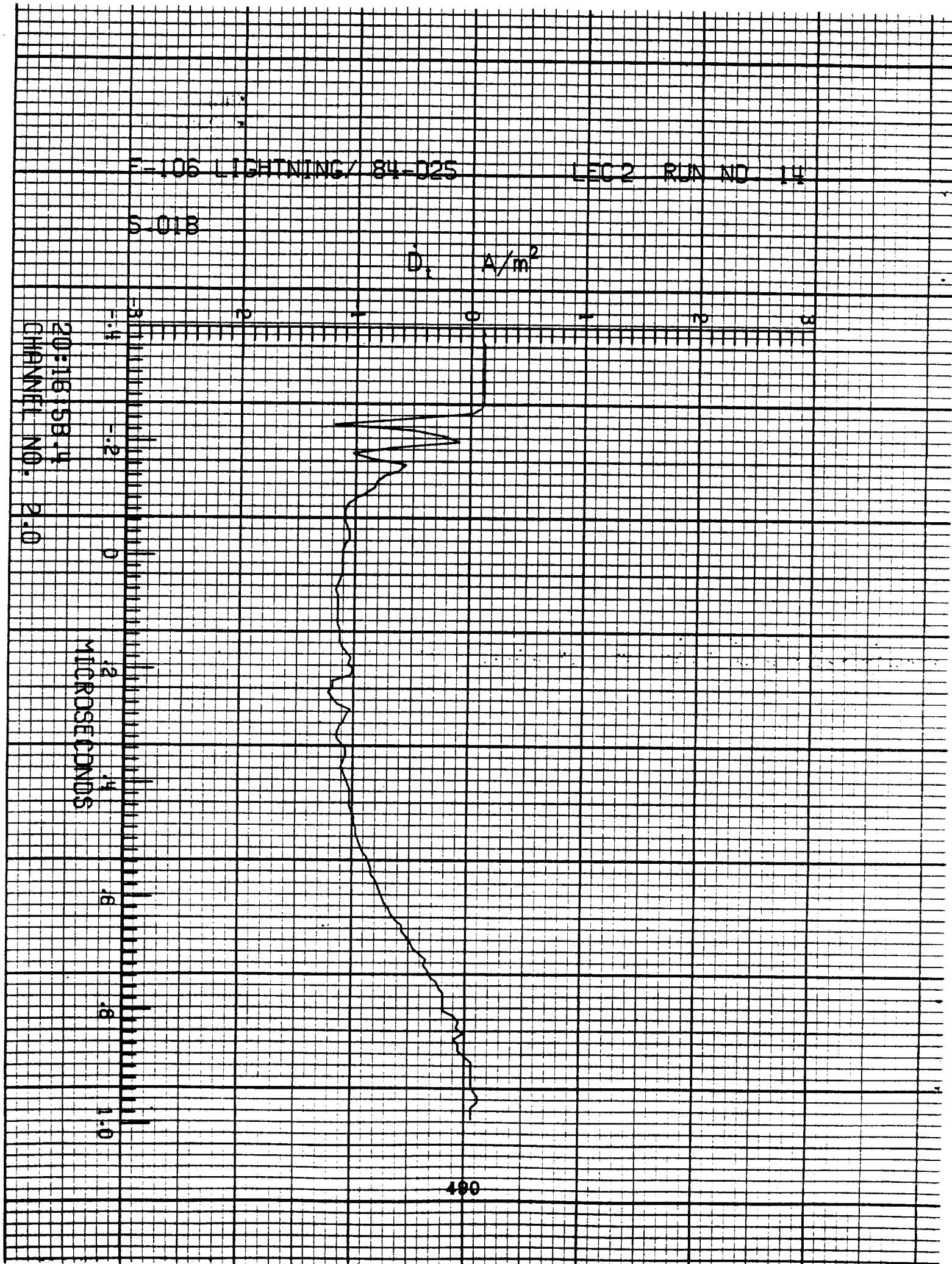
$\dot{B}_{wr}$ T/s

-800 -600 -400 -200 0 200 400 600 800

-1.8 -1.6 -1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0 1.2 1.4 1.6 1.8

MICROSECONDS

20:16:58.F
CHANNEL NO. 11.2


F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 14
S.018
$\dot{D}_t$ A/m^2
-3
-2
-1
0
1
2
3
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:16:58.4
CHANNEL NO. 2.0

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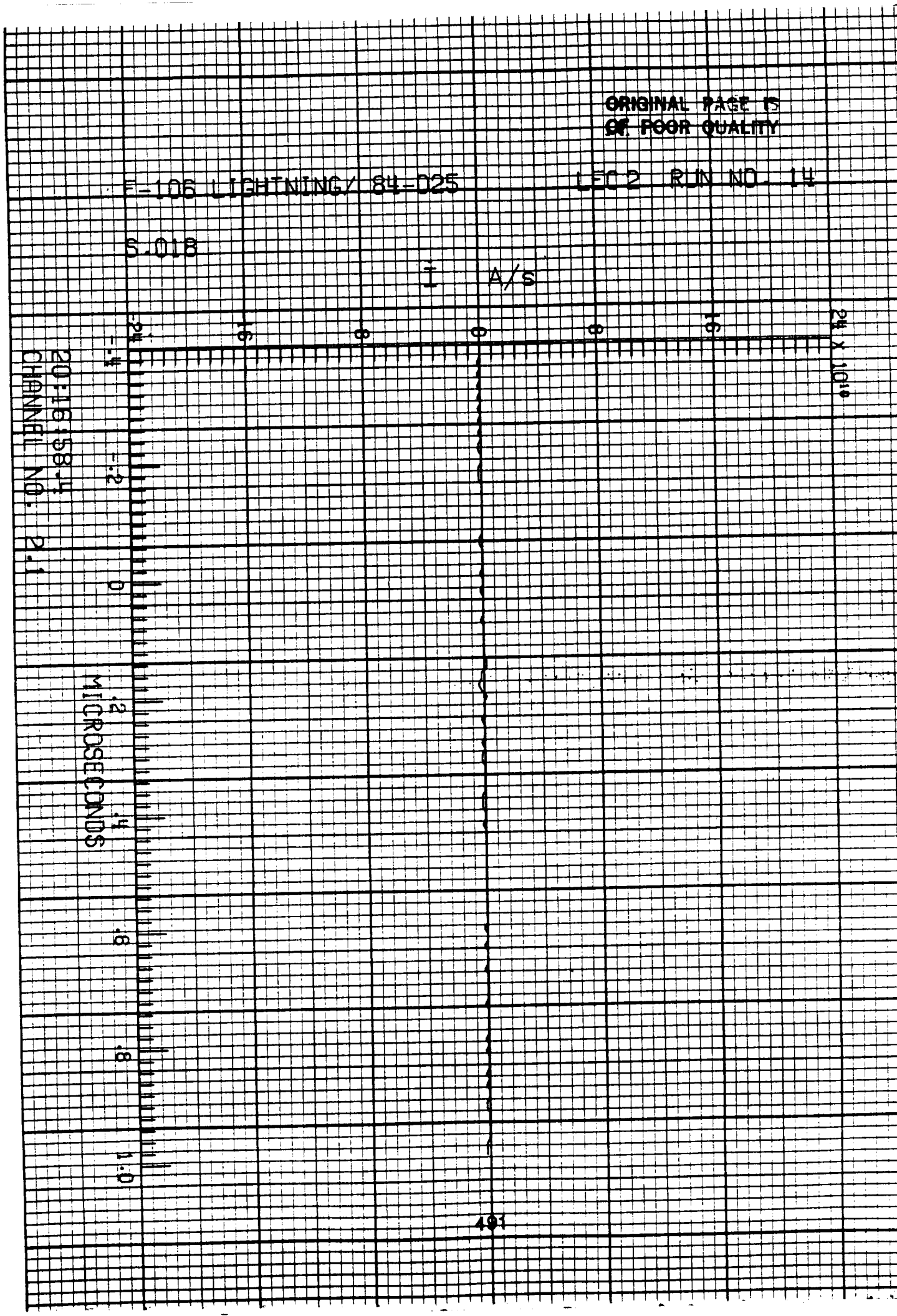

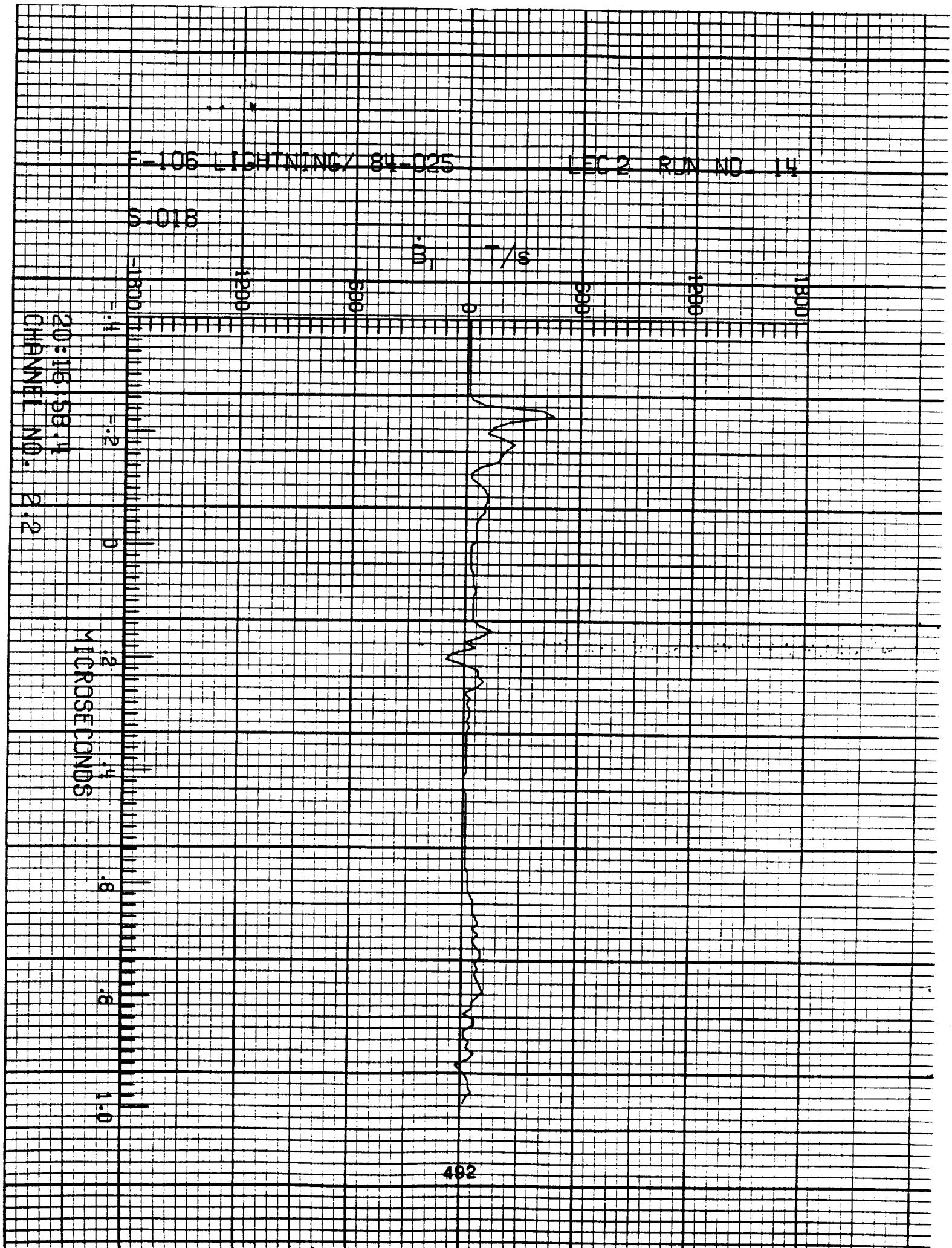
F-106 LIGHTNING/ 84-025
LEC 2 RUN NO. 14
S.018
$\dot{B}_1$ T/s
-1800
-1200
-600
0
600
1200
1800
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:16:58.4
CHANNEL NO. 2.2

ORIGINAL PAGE IS
OF POOR QUALITY

F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 14

S.018

$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0

MICROSECONDS

20:16:58.4

CHANNEL NO. 8.0

C-6

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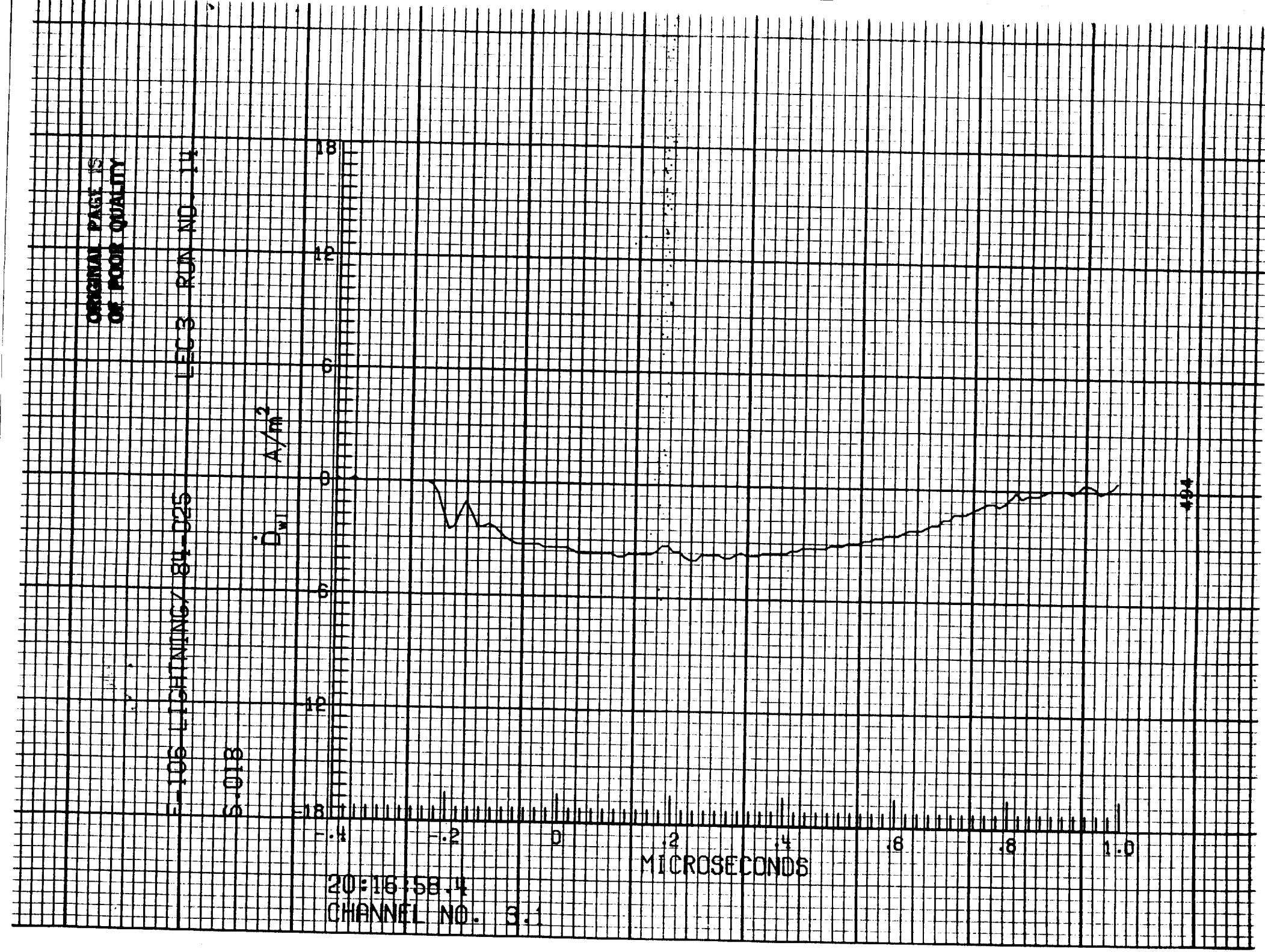

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F-106 LIGHTNING/ 84-025 LEC 3 RUN NO. 14

S.018

$\dot{D}_r$ A/m^2

-12 -8 -4 0 4 8 12

20:16:58.4
CHANNEL NO. 3.2

-1.4 -.2 .0 .2 .4 .6 .8 1.0

MICROSECONDS

F-106 LIGHTNING/ 84-025 LEG 4 RUN NO. 14

S-018

V_{fa} V

-50 -40 -30 -20 -10 0 10 20 30 40 50

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:16:58.4

CHANNEL NO. H.D

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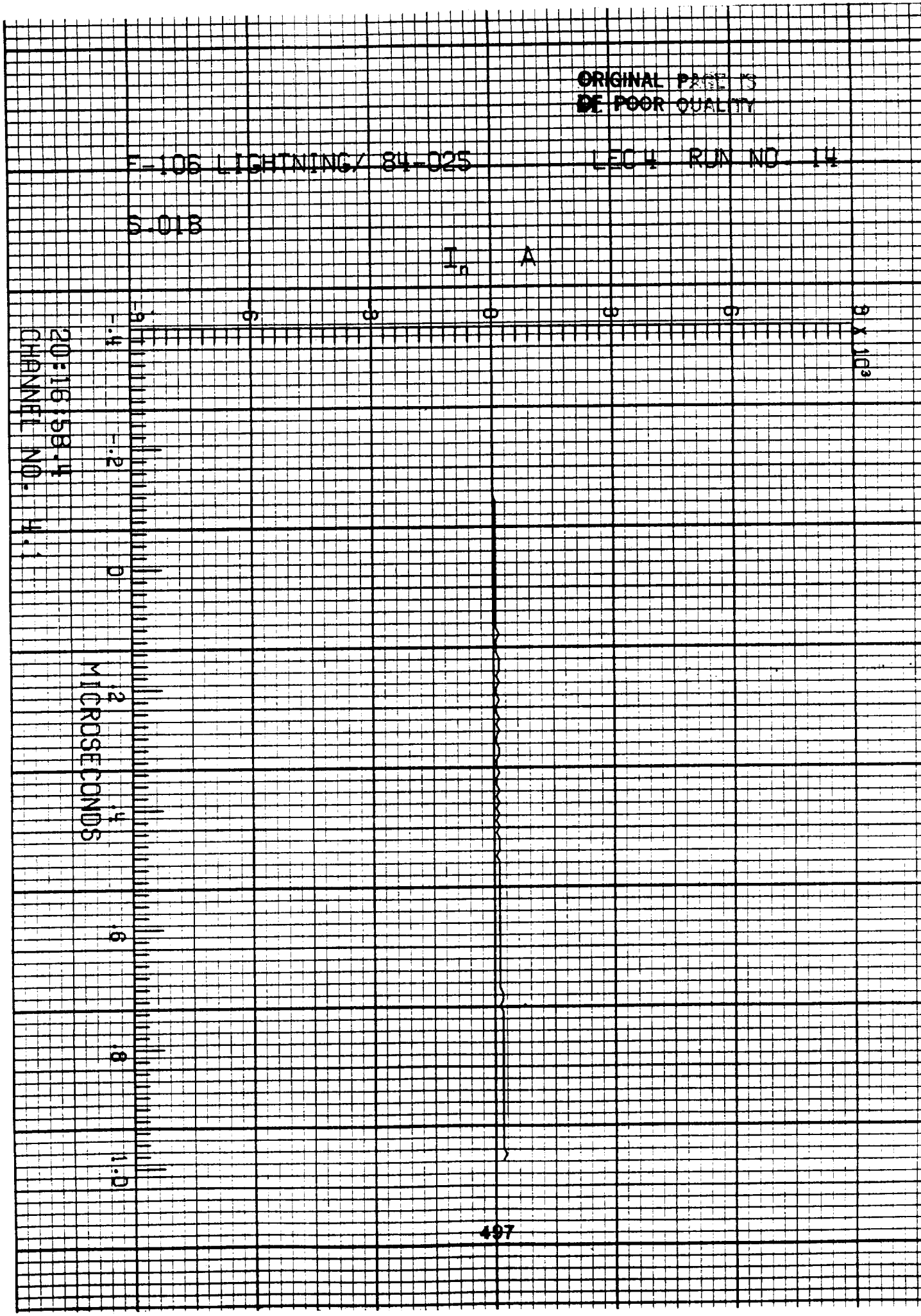
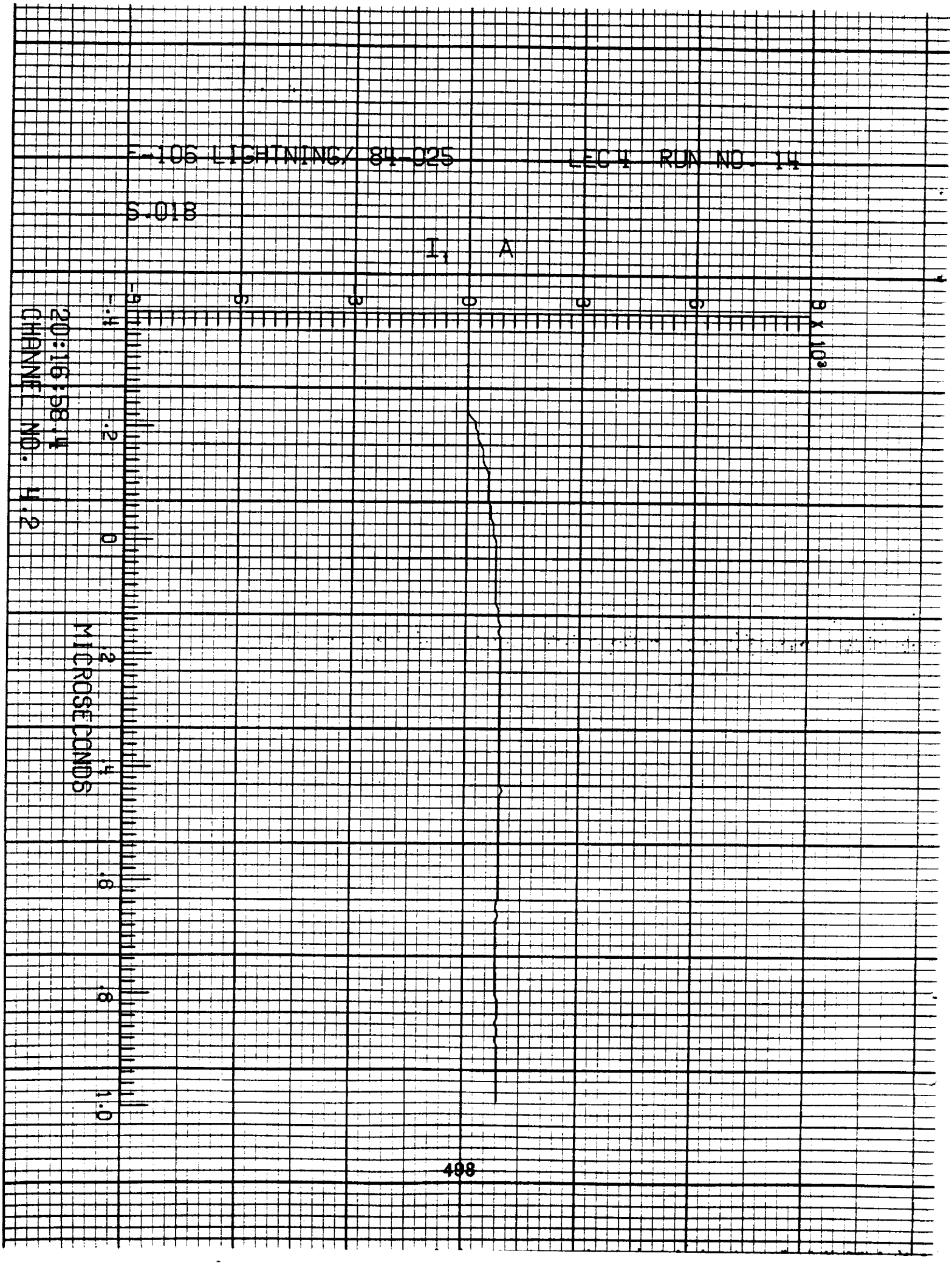
F-106 LIGHTNING/ 84-025 LEC 4 RUN NO. 14

S-018

I_n A




F-106 LIGHTNING/ 84-025
LEC 4 RUN NO. 14
S.018
I1 A
-9
-6
-3
0
3
6
9 x 10³
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:16:58.4
CHANNEL NO. 4.2

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F-106 LIGHTNING/ 84-025 LFC1 RUN NO. 15

6.019

$\dot{B}_w$ T/S

-800 -600 -400 -200 0 200 400 600 800

-.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

20:18:53.2
CHANNEL NO. 1.1

F-106 LIGHTNING/ 84-025 FC1 RUN NO. 15

6.019

$\dot{B}_{wr}$ T/s

-500 -400 -300 -200 -100 0 100 200 300 400 500

20:18:53.2

CHANNEL NO. 1

-1.2 -.8 0 .8 1.6 2.4 3.2 4.0 4.8

MICROSECONDS

500

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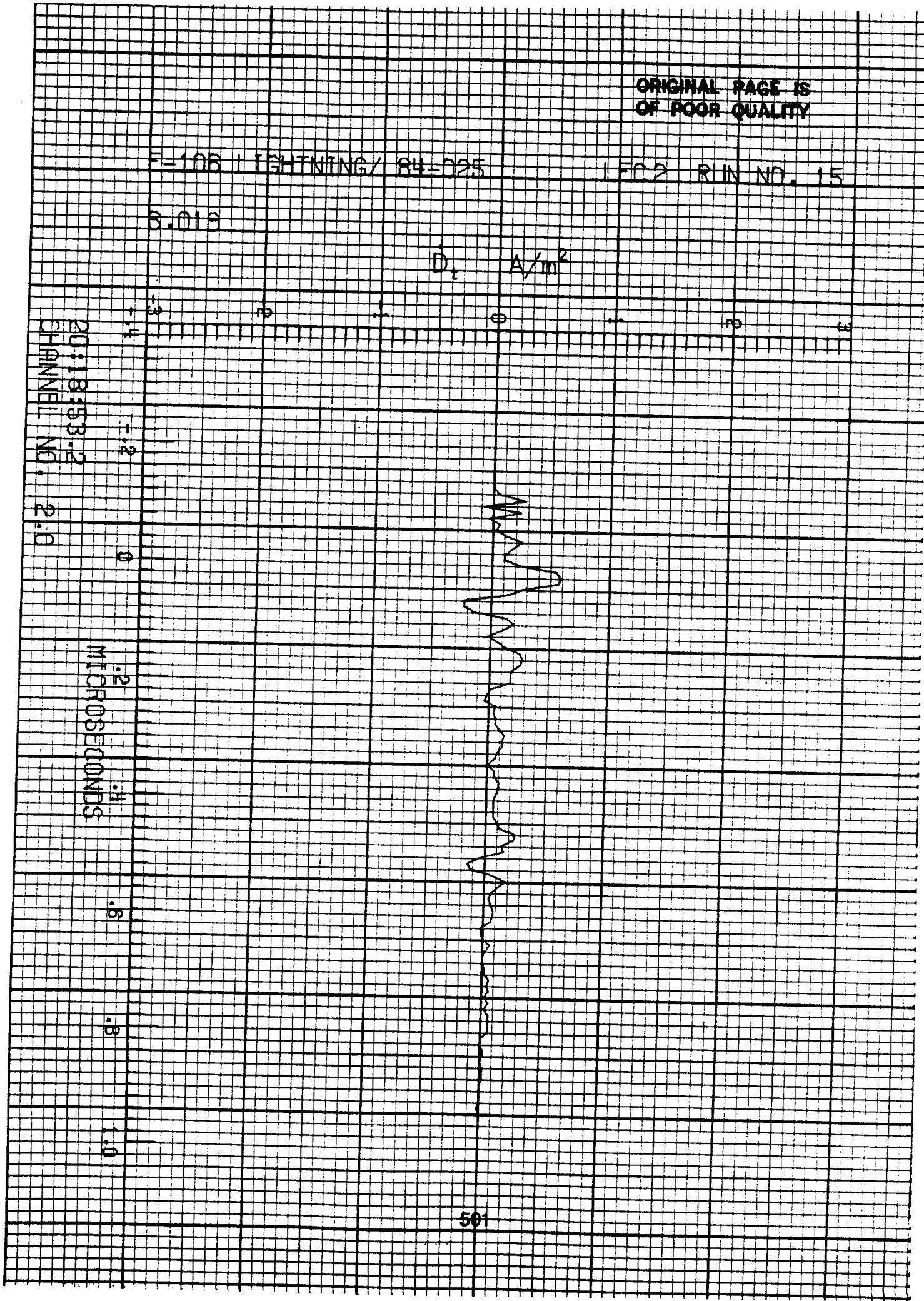

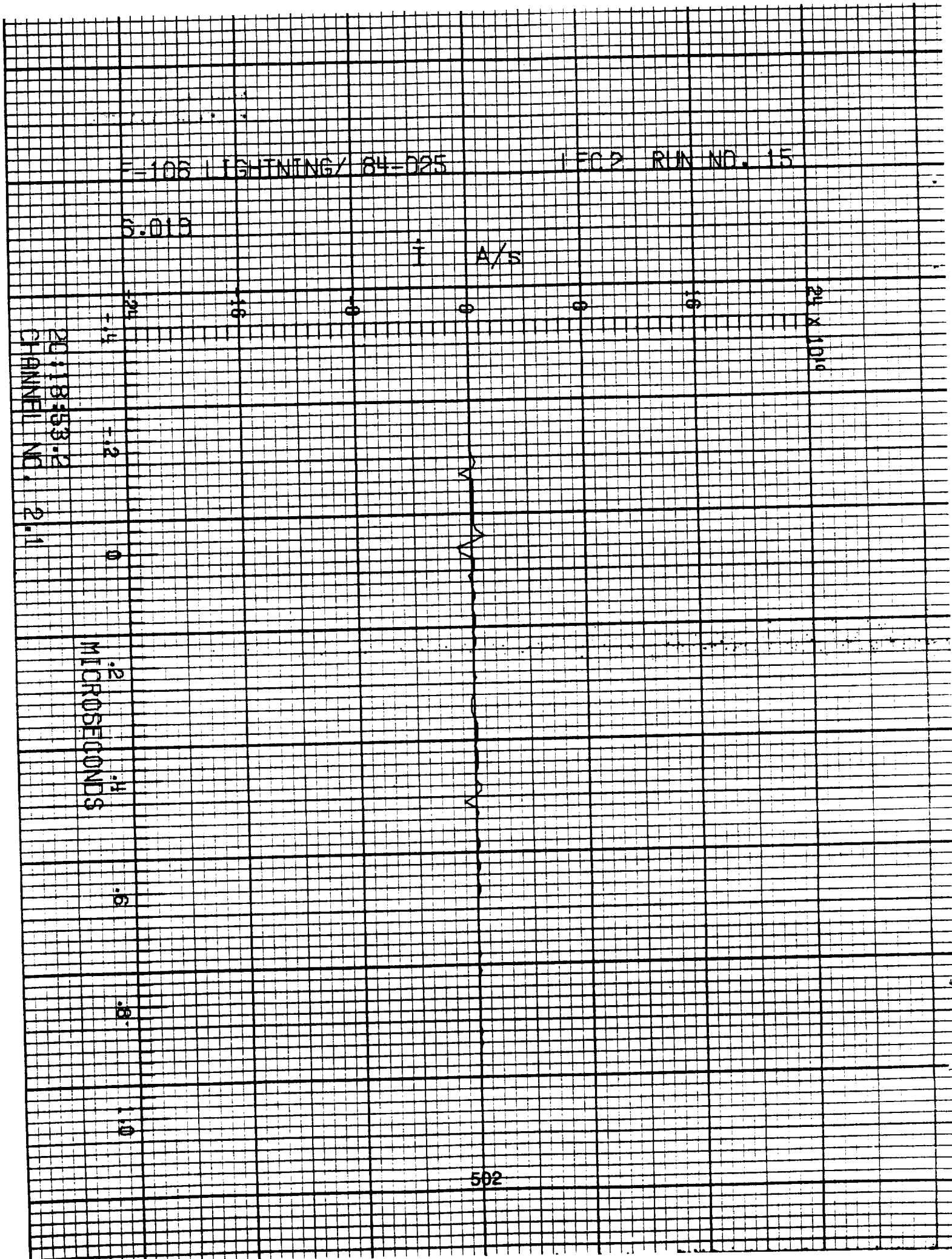
F-106 LIGHTNING/ 84-025
LEC2 RUN NO. 15
6.019
İ A/s
-24
-16
-8
0
8
16
24 x 10^10
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS
20:18:53.2
CHANNEL NO. 2.1

ORIGINAL PAGE IS
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F-106 LIGHTNING/ 84-025 1 FEB 2 RUN NO. 15

6.019

$\dot{B}_1$ T/S

-1800 -1400 -800 0 800 1400 1800

-1.4 -1.2 0 .2 .4 .6 .8 1.0

20:18:53.2

CHANNEL NO. 2.5

MICROSECONDS

F-106 LIGHTNING/ 84-025 IFC 3 RUN NO. 15

6.019

$\dot{D}_{wr}$ A/m^2

-18 -12 -6 0 6 12 18

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2

MICROSECONDS

20:18:58.82

CHANNEL NO. 3.0

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F-106 LIGHTNING/ 84-025 LFC3 RUN NO. 15

6.019

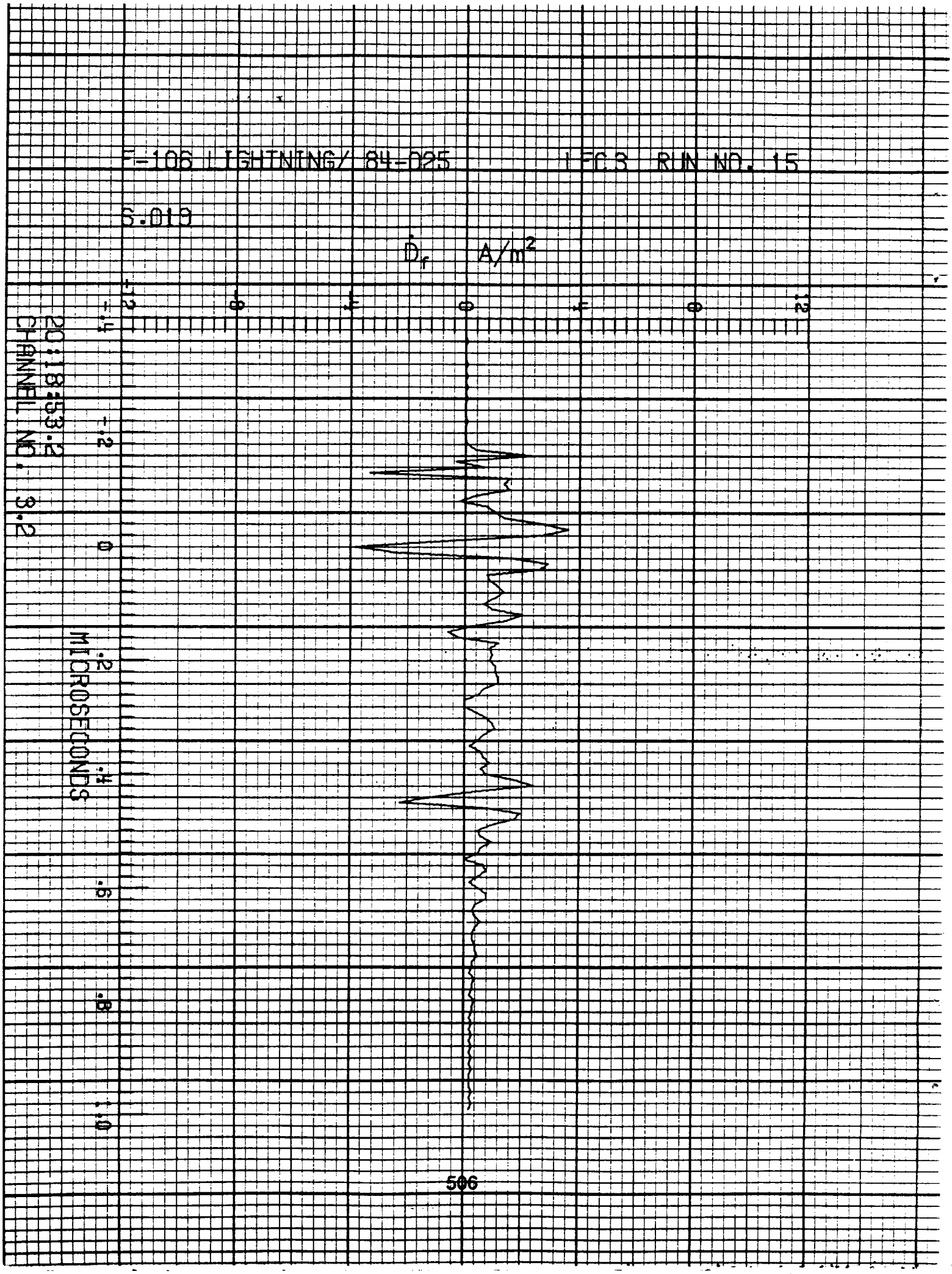
$\dot{D}_{wi}$ A/m^2

+.8 +.6 +.4 +.2 0 -.2 -.4

20:18:53:2
CHANNEL NO. 3.1

MICROSECONDS

.2 .4 .6 .8 1.0


F-106 LIGHTNING/ 84-025
LFC3 RUN NO. 15
6.019
$\dot{D}_f$ A/m^2
-12
-8
-4
0
4
8
12
20:18:53.2
CHANNEL NO. 3.2
-.4
-.2
0
.2
.4
.6
.8
1.0
MICROSECONDS

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F-106 LIGHTNING/ 84-025 IFC4 RUN NO. 15

6.019

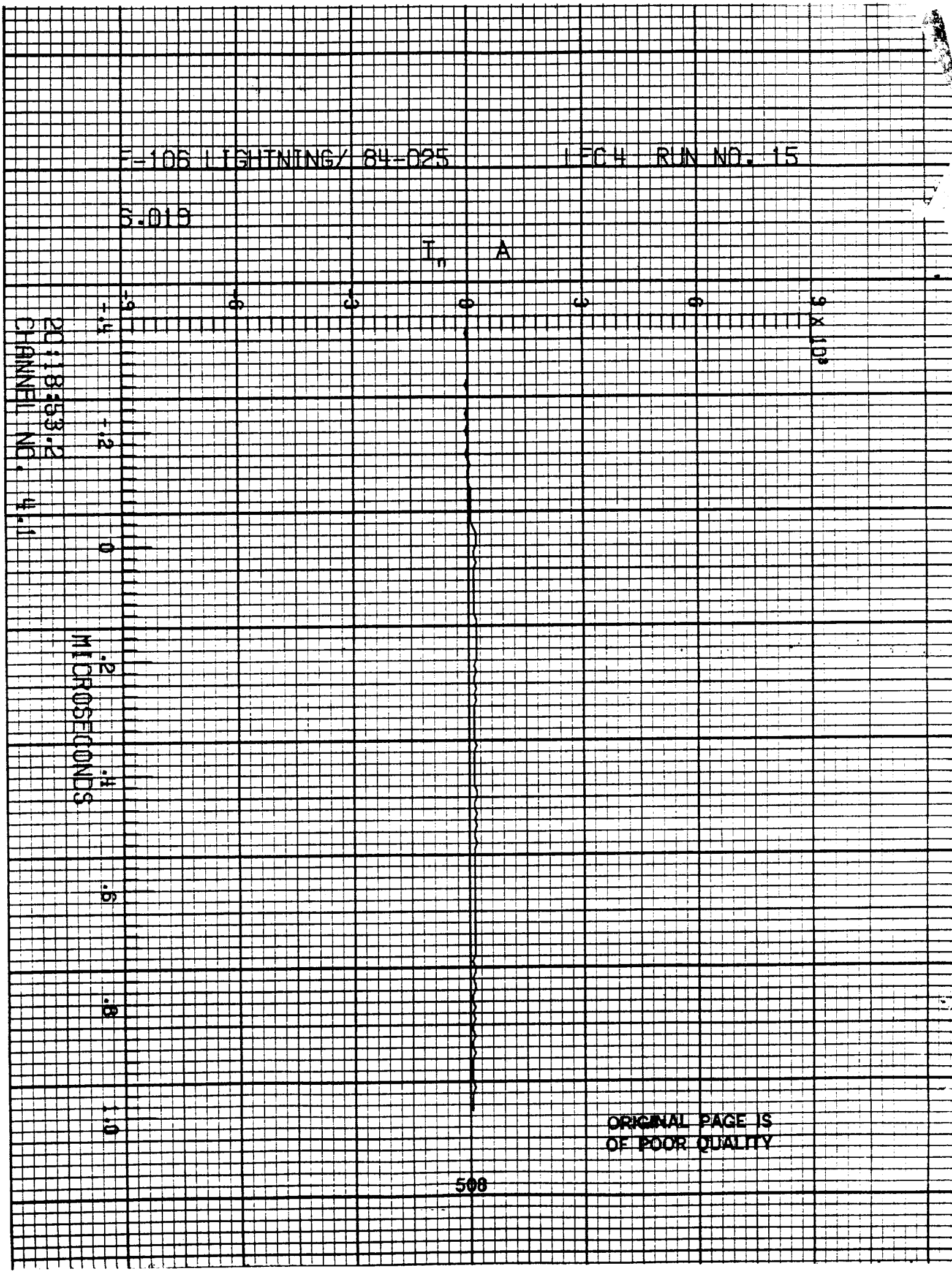
V_{fa} V

-60 -40 -20 0 20 40 60

-1.4 -1.2 -1.0 -.8 -.6 -.4 -.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

20:18:53.12
CHANNEL NO. 4.6



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F-106 LIGHTNING/ 84-025 IFC4 RUN NO. 15

6.019

I_t A

+5 4 3 2 1 0 $\times 10^3$

20:18:53.2
CHANNEL NO. #2

-1.4 -1.2 0 .2 .4 .6 .8 1.0

MICROSECONDS

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15. Supplementary Notes

16. Abstract

Data waveforms are presented which were obtained during the 1984 direct-strike lightning tests utilizing the NASA F106-B aircraft specially instrumented for lightning electromagnetic measurements. The aircraft was operated in the vicinity of the NASA Langley Research Center, Hampton, Virginia, in a thunderstorm environment to elicit strikes. Electromagnetic field data and conduction currents on the aircraft were recorded for attached lightning.

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